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Boston Society of Natural History.

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PROCEEDINGS

-OF THE-

Natural Science Association,

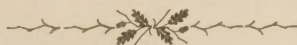
-OF-

STATEN ISLAND.

VOL. I.

Including the five years beginning November 10, 1883,
and ending October 13, 1888.

Edited by ARTHUR HOLLICK, Corresponding Secretary, and WM. T. DAVIS, Curator.



NEW BRIGHTON.



[*Price per vol.*, \$2.50. *Single Numbers*, 5 cents. *Address the Corresponding Secretary,*
New Brighton, Staten Island, N. Y.]

PREFACE.

The NATURAL SCIENCE ASSOCIATION OF STATEN ISLAND was organized November 12th, 1881, with a membership of fourteen, and during the first two years of its existence no records were published. It was thought better to first ascertain, by actual experience, whether the ASSOCIATION was reasonably sure of becoming a permanent institution. At the end of this period the steady growth which it showed both in membership and contributions, and the encouraging recognition which was received from all directions seemed to justify the experiment. Accordingly the publication of the PROCEEDINGS was begun. These have since been issued, without interruption, up to the present time, partly in the form of records of the regular meetings of the ASSOCIATION, and partly as "extras" or "specials," which latter were published at such times as were found to be most convenient. It was decided at the beginning to print only such material as was of strictly local interest, in the firm conviction that the chief value of the PROCEEDINGS would be to serve as authentic records of facts in regard to the natural history and antiquities of the Island. If such records had been kept during the past fifty years, many items of value and interest would have been preserved for us, which are now either lost entirely or else amount to mere uncertain tradition. Even within the past five years the rapid growth of the community has obliterated many of our most interesting natural objects, and these PROCEEDINGS are now the only definite records that they ever existed, and contain the only published authentic facts in connection with them. That this work of the ASSOCIATION is appreciated may be seen in the recently published History of Richmond County, by Richard M. Bayles, in which the PROCEEDINGS and notes by individual members have contributed more than twenty-five pages to the book in regard to the geology, mineralogy, flora, fauna and antiquities of the region, comprising the entire chapter upon the natural history of the Island, which would otherwise have had to be omitted.

As the fifth year of publication ended on October 13th, 1888, it was decided to terminate the first volume at that date. To prepare an index for this volume has been a matter of considerable difficulty. The pages are not numbered nor have scientific names been uniformly italicised or

erwise accentuated in the text. An index has, however, become a
ter of imperative necessity, not only for our own convenience in hunt-
up records of local interest, but also as an act of common courtesy to our
ranges and to the libraries where our PROCEEDINGS are kept on file.
hoped that these explanations will serve to excuse any imperfections
may be detected.

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(* This should not have been designated "Extra No. 5." It is merely a memorandum. The succeed-
Extras" and "Specials" are numbered without reference to it).

1885
2/19

The Natural Science Association, OF STATEN ISLAND.

CERTIFICATE OF INCORPORATION.

TO ALL WHOM IT MAY CONCERN:—

The undersigned, citizens of the United States, and of the State of New York, and residents of the County of Richmond, desiring to associate themselves for scientific purposes, and to form a body corporate under the provisions of Chapter 319 of the laws of 1848, entitled "Act for the Incorporation of Benevolent, Charitable, Scientific and Missionary Societies," and the several acts amendatory thereof, do hereby make, sign, and acknowledge the following certificate of incorporation:

(1.) The name and legal title of this society shall be "THE NATURAL SCIENCE ASSOCIATION OF STATEN ISLAND."

(2.) The particular business and object of this Association shall be to collect and preserve objects of natural science and antiquity, with special reference to local matters, and to diffuse direct knowledge in regard to the same, by means of publications, meetings and public lectures.

(3.) The management of the business and affairs of this Association shall be intrusted to a board of five trustees, which, for the first year of its incorporation, shall consist of the following named persons:—Alfred Ludlow Carroll, M. D., Ernest A. Congdon, Arthur Hollick, Ph. B., William T. Davis and Samuel Henshaw.

(4.) The principal office of this Association shall be located in the village of New Brighton, in the State of New York, and the County of Richmond aforesaid.

In witness whereof we have hereunto annexed our hands and seals on this the 19th day of January, in the year of our Lord one thousand eight hundred and eighty-five.

ALFRED LUDLOW CARROLL.
ERNEST A. CONGDON.
ARTHUR HOLLICK.
WILLIAM T. DAVIS.
SAMUEL HENSHAW.

STATE OF NEW YORK, }
COUNTY OF RICHMOND. }

On this, the 19th day of January, 1885, appeared before me Alfred Ludlow Carroll, M. D., Ernest A. Congdon, Arthur Hollick, Ph. B., William T. Davis and Samuel Henshaw, to me personally known to be the same persons described in and who signed and executed the foregoing certificate, and they severally acknowledged the execution thereof.

ROBERT HUMPHREY,

Notary Public, Richmond Co., N. Y.

I, the undersigned, Justice of the Supreme Court, of the Second Judicial District, hereby approve the within certificate, and consent to the filing of the same.

C. E. PRATT, J. S. C.

Filed with the County Clerk of Richmond Co., N. Y., on Friday, Jan. 30, 1885.

ARTHUR HOLLICK, Ph. B.
SAMUEL HENSHAW.

Filed with the Secretary of State of New York State, on Thursday, Feb. 19, 1885.

ALFRED LUDLOW CARROLL, M. D.

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Science

PROCEEDINGS

— OF THE —

Natural Science Association, OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *November 10th*, 1883.

Meeting called to order at 8.15 P.M.
Mr. Hollick elected temporary chairman.
This being the third annual meeting,
reports of officers for the past year were
read and accepted.

The treasurer reported the Association
free from debt, and with a balance of \$28
in the treasury.

The secretary reported a total of 70
members on the roll, and an average at-
tendance of 17 at each meeting.

The curator reported 56 separate dona-
tions to the collections, consisting of 412
objects, besides additions to the library.

The election of officers for the ensuing
year was then held, with the following
result:—

President, A. L. Carroll, M. D.

Treasurer, Samuel Henshaw.

Recording Secretary, Chas. W. Leng.

Corresponding Secretary, Arthur Hol-
lick.

Curator, Wm. T. Davis.

Committees were appointed, and other
business transacted, after which the fol-
lowing objects were presented and dis-
cussed:—

By Mr. Henshaw—Cannon ball, plowed
up on the estate of Mrs. J. C. Green, New
Brighton—a relic of the war of the Revolu-
tion. Near the same locality was also
found an old flint-lock and a British
guinea.

By Mr. Eadie—Two flint arrow heads—
one from the waters of Staten Island
Sound near Buckwheat Island, and the
other from Bloomfield. Also specimens
of *Sabbatia chloroides*, from Chelsea; a
plant new to the Island.

By Mr. Chas. Butler—Large nest of
Vespa maculata, the "spotted wasp," with
an account of the manner in which the
"queens" live through the Winter in de-
cayed stumps and start a new colony in
the Spring. The material of which the
nest is made is a sort of paper, formed by
the maceration of wood and bark with a
sticky saliva secreted by the wasps. The
"queen" starts the nest, which the new

colony work at and complete. In the
Autumn all but the "queens" perish, and
often many of the larvæ dying in the nest
which accounts for the bad odor some-
times noticed in connection with them.

By Mr. Davis—A butterfly not previ-
ously known on the Island, *Pyrgus tessel-
lata*—captured near the Billop House,
Tottenville, Sept. 29. The main point of
interest consists in its wide distribution,
having been found from the Atlantic to
the Pacific, though not north of this lati-
tude.

By Mr. Britton—A small Indian stone
hammer, found in one of the shell mounds
near the Billop house Nov. 4th. Remarks
were made upon its possible use in crush-
ing the oysters, whose shells are so abund-
ant in that locality.

By Mr. Hollick—Stone anvil, found at
the same time and place as the latter,
probably having been used in connection
with it. Also fossil leaf impressions, with
a carefully prepared drawing of the same,
from the shale and sandstone on the shore
at Tottenville. Mr. Britton spoke at some
length in regard to this discovery, and
stated that it was likely to prove the most
important one yet made by the Association.
Geologically it is a link in the chain con-
necting Glen Cove, L. I., with Keyport,
N. J., at each of which localities similar
fossils have been found. The age of the
rocks containing them is a matter of dis-
pute, some authorities referring them to
the cretaceous and some to the tertiary.
It is quite possible that a careful study and
investigation of our locality may be of far
more than mere local importance. A field
day, with this matter in view, will be held
on the 18th inst.

By Mr. Sawyer—A stuffed specimen of
Corvus Americana, the common crow, shot
through the head by a rifle ball

In addition to the preceding there were
many minor specimens, amongst which
were garnets in granite, from Tottenville;
cones of the white pine (*Pinus strobus*),
curious fungoid growths, &c.

Adjournment at 10.30 P.M.

PROCEEDINGS
— OF THE —
NATURAL SCIENCE ASSOCIATION,
OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *December 8th, 1883.*

Meeting called to order at 8.30 P. M. Two new members were elected and other business transacted, after which Mr. Hollick gave an account of the recent fossil leaf discoveries at Tottenville. The points were illustrated in full by means of drawings, blackboard sketches and a fine suite of specimens from Long Island and New Jersey, loaned for the occasion through the courtesy of Professor Newberry, of Columbia College.

Mr. Hollick spoke as follows: At our last meeting a description was given of certain fossil leaf fragments from Tottenville, and a few specimens were shown. Since then, I am happy to say, the locality has been again visited and many more specimens found. There are three distinct kinds of rock containing these fossils—a hard red or gray ferruginous sandstone; a soft gray sandstone, and a peculiar conglomerate composed almost wholly of vegetable remains, cemented together with what is apparently limonite or sesqui oxide of iron. In the soft gray sandstone the remains are not yet destroyed, but are in the form of carbon or lignite. In the other rocks the vegetable tissue has almost entirely disappeared, and only the impressions remain. The rocks are found in blocks or fragments, none of them greater than a foot square, scattered along the beach, mostly at the base of the bluff, which is composed of drift. From our present knowledge it is not possible to decide whether they were torn up from an out-crop below high water mark and cast upon the beach, or washed out from the base of the bluff. Geologically, they no doubt belong to the Cretaceous, although our present proofs are not yet sufficient to state this to a certainty.

Dr. Britton, of Columbia College, has kindly furnished me with the following notes:

"The occurrence of similar fossiliferous sandstones on the beach near Glen Cove, Long Island, and vicinity, has been known or some time. There they are found in precisely the same position as at Tottenville, and are associated with extensive beds of fire clay, kaolin, &c. The Tottenville station is not immediately on these clays, but they are found near by in several directions, notably, at Kreischerville. That the two localities mark outcrops of the same geological formation, and probably approximately of the same strata, is almost certain. The physical structure of the Glen Cove series is exactly parallel to that of certain of the clay beds of Middlesex County, N. J., which are well known to belong to the Cretaceous Epoch. In the absence of sufficient fossil evidence we cannot state with absolute certainty that the two deposits are equivalent, but there is little doubt that this will ultimately be proven, and that the New

Jersey and Staten Island clays, kaolins, lignites, &c., find another and their most northern outcrop on the north shore of Long Island, at or near Glen Cove."

The exact parallelism between our Staten Island specimens and those from Glen Cove can be seen at a glance, in fact they would be undistinguishable but for the labels, with the exception of the leafy conglomerate before described, which does not seem to be represented elsewhere—it is possibly peculiar to Staten Island.

Thus far we have failed to find any remains in our clay beds similar to those from Amboy, but the unexpected discovery at Tottenville should encourage further research, and there seems to be no doubt that at some future time our efforts are likely to be crowned with success.

In determining the genera and species of fossil plants we have to depend mostly upon the veining of the leaves, which is not by any means as satisfactory as we could wish. Genera can be determined with comparative accuracy; thus we have no doubt that one of our Tottenville fossils is a willow, though what particular species it is impossible to say; another is undoubtedly an evergreen, allied to our juniper or arbor-vitæ. The larger specimens are probably willows, viburnums and sour gums. There are also a few fragments with parallel veins—no doubt belonging to the grasses—a small fruit or nut, and a piece of what appears to be an equisetum or horse-tail rush. These, with other indistinguishable fragments, complete our list. Such results may seem small in themselves, but they may lead to determinations of considerable geological value and interest, by helping to clear up disputed points regarding the position of the deposits in which the fossils occur.

The following objects were also exhibited:

By Mr. Sawyer:—Stuffed specimen of white-throated sparrow, shot at Snug Harbor. It occurs here only as a bird of passage, breeding in Canada.

By Mr. Davis:—Specimen of a butterfly, new to the Island, caught by Miss Britton at New Dorp. It is called *Grapta J album*, or the White J butterfly, from the peculiar white mark, resembling a J, on the under side of the hind wings. This is probably about its southern limit, as it is only known to be common further north, and only this one specimen has been seen here.

By Mr. Eadie:—Arrow head, picked up in a field near Bloomfield.

By Mr. Hollick:—Three stone implements, probably sinkers, found since the last meeting in the shell mounds at Tottenville, and an arrow head found by Mr. Davis at the same place and time.

Meeting adjourned at 10.15.

PROCEEDINGS

— OF THE —

Natural Science Association,

OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, January 12th, 1884

Meeting called to order at 8 20 P.M.

One new member was elected and other business transacted. Mr. C. W. Leng then read a paper on the *Cicindelidae* of Staten Island. He spoke in substance as follows:—Believing that a list and description of our native beetles would be of great use to those of our members interested in such things, I have prepared the following paper, hoping to add to it from time to time as our knowledge of our Staten Island Fauna increases.

The *Cicindelidae* form the first family of *Coleoptera* or Beetles, which may be briefly distinguished from other insects by the possession of four wings, of which two (the anterior pair) are hardened with cutine. In rest this hard pair of wings are laid back, completely covering and concealing the posterior pair; in flight the latter only are used, they being membranous and fitted therefor, while the anterior pair are simply spread apart and raised so as to be out of the way.

Cicindelidae may be separated from other *Coleoptera* by the following characters: The hind tarsi have the same number of joints as the tarsi of the other legs; the first three ventral segments are connate; the antennæ are 11-jointed, and inserted upon the front above the base of the mandibles; the legs are very long and slender. The colors are often bright and metallic looking, and all the species are terrestrial in habits.

The larvæ are whitish grubs with large flat metallic colored heads and long powerful mandibles. They live in holes from six to eighteen inches deep, dug on sloping ground or on the side of a low bank or hill, usually lying at the entrance, on the alert for any small insect that may pass. They are exclusively carnivorous. The larvae have not been found as yet on Staten Island.

The beetles themselves live all summer in sunny places in the woods, roadsides, and on the sands at the sea shore. They

are able to make short flights which they do at the least alarm, flying a few paces, at a foot or two from the ground, and then dropping quite suddenly. Their colors always mimic the places at which they are found, which makes it difficult to distinguish them after they alight. During the night and rainy days they hide in holes dug in the sand or among piles of chips and bark.

The following (eight) species have been found on Staten Island—

Cicindela sexguttata, Fab—In woods throughout the Island.

Cicindela purpurea, Oliv—In the woods also.

“ *generosa*, Dej—Roadsides, Watchogue.
“ *tranquebarica* Hb—Watchogue, roadsides.

Cicindela repanda, Dej—Sandy roads, everywhere.

Cicindela hirticollis, Say—Sandy roads, everywhere.

Cicindela dorsalis, Say—South Beach.

“ *punctulata*, Fab—Roadsides, and we hope to find two, perhaps three more that are found in New York and New Jersey.

These species may be distinguished as follows:—

C. sexguttata is bright metallic green with six white spots.

C. purpurea is shining purple and green with white lines and curved markings.

C. generosa is dull grayish purple with white marks like *purpurea*.

C. tranquebarica is grayish, almost black, with white marks shaped as in *generosa*, but the marks are very narrow fine lines while on *generosa*, they are quite broad.

C. repanda resemble each other and *tranquebarica*. All have a humeral C-shaped lunule, the lower end of which in *tranquebarica* points to the apex, in *hirticollis* to the scutellum, while in *repanda* it is a plain C.

C. dorsalis is opaque white with grayish marks.

C. punctulata is blackish metallic with numerous minute white dots. It is also the smallest of our species.

Mr. Leng at the close of the discourse presented specimens of the above named species to the society.

Remarks were made by Mr. Seehusen on a very interesting series of precious stones, their particular characters, and the localities from which they came. He presented the collection to the society.

Adjournment at 9.45 P.M.

PROCEEDINGS
— OF THE —
Natural Science Association,
OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *February 9th, 1884.*

Meeting called to order at 8 P.M.

The regular business of the association was transacted, after which Mr. Wm. T. Davis read a paper on the development of the wings in the Hickory Moth; (*Halisidota Caryæ*.) after its emergence from the pupa.

Following the preliminary remarks on the species, the paper continued as follows:—The wings of insects appear in the preparatory stages of the pupa from the side of the thorax, and above the insertion of the legs, and they are simply expansions of the crust, permeated by trachæ. When the pupa skin is thrown off they expand with air, and attain their normal size in a very short time.

The box containing my cocoons was kept in a warm room, and as a consequence a number of the moths emerged during December, several of which I observed while developing. I invariably noticed that they came from the cocoons about 7 o'clock in the evening, and that they always moved so as to receive the full rays from the lamp. On January 2d of this year I was attracted to my box by hearing a slight rasping sound, but upon opening it was unable to discover the cause. I watched, however, and soon from a cocoon fastened to the top of the box a moth emerged, coming out very quickly, and not stopping until it had moved about two inches away. It was just then twenty-three minutes to eight. Its wings were about $\frac{1}{8}$ in. long and seemed very little crumpled. I had to be very careful in measuring lest I disturb the insect. Soon the development of the wings became apparent, growing about $\frac{1}{10}$ in. in two minutes, but widening greatly at the same time. The part next to the body, or base of the wing, was the first to develop, and when about the basal third had attained its normal shape the remainder seemed to be in hopeless disorder. By carefully watching the spots on the wings they were seen to gradually separate; not by

any means equally on both wings, but rather the reverse seemed to be the case. The wings grew at times with a pulsating movement, but this could not always be servedob. In thirteen minutes they were of full size. Gradually the wings were raised erect over its back. In this position I watched it for five minutes, when taking a blotter and holding it horizontally, I made the insect walk its entire length, for the purpose of seeing if the wings were strong enough to remain erect. They were not, however—about the apical third falling over—the blotter was therefore stood on end again. In five minutes more I repeated the same experiment, and this time the wings remained erect.

At 10 minutes past eight the wings were lowered from the erect position assumed in drying to that commonly taken by the insect when at rest.

There is one thing in particular to which I would call attention, and that is the hour at which these insects emerge from the chrysalis—an hour at this season when all is dark. How interesting it is then, to observe that though the heat of the stove has shortened their stage as pupæ by five months, yet, if their existence had been continued until next June, these same insects, at about the same hour, would have crawled up from among the leaves and developed under a sun, which would at that time be sufficient to dry their wings for the first flight. This fact is not without interest, when it is remembered that insects possess some control over the time of emerging from the pupæ.

Mr. E. M. Eadie exhibited, and presented to the society, a portion of an indian ax and an arrow head, which he collected at Watchogue.

Dr. N. L. Britton exhibited a specimen of "mountain leather" collected by Mr. B. B. Chamberlain, on S. I. This variety of serpentine has not hitherto been known to occur in this locality, and is therefore an interesting addition. It is usually found in a thin stratum, running through the harder rock, and may be readily known by the way in which the fibers are interlaced.

Adjourned at 10 P.M.



Butterflies of Staten Island.

FEBRUARY, 1884.

In the following list of the Butterflies of Staten Island, none but actual captures have been named, as those seen on the wing alone, however strong the opinion may be as to what species they belong, are often misleading. In this way error and truth often become unintentionally mixed.

We wish it to be considered that we do not regard the list as complete. Among the Hesperidæ, especially, several additions may be looked for.

WM. T. DAVIS.

Papilionidæ.

- Papilio Philenor, L.
" Asterias, F.
" Troilus, L.
" Turnus, L.
" " dim. var Glaucus, L.
" Cresphontes, Cram.
Pieris Protodice, Bd-Lec.
" Oleracea, Bd.
" Rapae, L.
Colias Philodice, Godt.
" " var Alba.
Terias Nicippe, Cram. Common in 1880; saw none before nor since.
Terias Lisa, Bd.

Nymphalidæ.

- Danaïs Archippus, F.
Argynnis Idalia, Drury.
" Cybele, F.
" Myrina, Cram.
" Bellona, F.
Euptoieta Claudia, Cram. One specimen, Clove Valley, C. W. Butler.
Melitæa Phaeton, Drury.
Phyciodes Tharos, Drury.
Grapta Interrogationis, F.
" " var Umbrosa, Lintn.
" Comma, Harr.
" " var Dryas, Edw.
" Progne, Cram.

- Grapta J Album, Bd. One specimen.
New Dorp, Miss M. Britton.
Vanessa Antiopa, L.
Pyrameis Atalanta, L.
" Huntera, Drury.
" Cardui, L.
Junonia Lavinia, Cram.
Limenitis Ursula, F.
" Disippus, Godt.
Neonympha Eurytris, F.
" Canthus, L.
Satyrus Alope, F.

Lycaenidæ.

- Thecla Humuli, Harr.
" Calanus, Hüb.
" Smilacis, Bd. C. W. Leng.
" Augustus, Kirby.
" Niphon, Hüb. Watchogue.
Chrysophanus Americana, D'Urban.
Lycaena Pseudargiolus, Bd-Lec.
" " var Violacea, Edw.
" " " Lucia, Kirby.
" " " Neglecta, Edw.
" Comyntas, Godt.

Hesperidæ.

- Ancyloxypha Numitor, F.
Pamphila Zabulon, Bd. Lec.
" " dim. var. Pocahontas.
" Sassacus, Scud.
" Peckius, Kirby.
" Mystic, Edw.
" Cernes, Bd-Lec.
" Manataqua, Scud.
" Verna, Edw.
Pyrgus Tessellata, Scud.
Thanaos Brizø, Bd.
" Juvenalis, F.
Pholisora Catullus, Cram.
Eudamus Pylades, Scud.
" Lycidas, Sm-Abb. One specimen, Clove Valley.
Eudamus Tityrus, F.

PROCEEDINGS

— OF THE —

Natural Science Association, OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *March 8th, 1884.*

Meeting called to order at 8.15 P.M.

Mr. Seehusen read a paper upon "Gems," giving a description and history of the principal stones used as gems, with specimens to illustrate the notes. The following matters of local interest were then presented:

By Mr. Leng, a paper upon the *Coccinellidæ* of Staten Island. The family *Coccinellidæ* comprises those *Coleoptera* or Beetles commonly known as Lady Birds, and may be recognized by the following characters:—The first ventral segment is visible for its entire breadth; the legs are short and the tarsi have only three joints, of which the second is dilated and spongy beneath; the antennæ are clavate; and finally the form is hemispherical, that is circular in outline and very convex.

The surface of the elytra is smooth, not hairy, and generally brightly colored and ornamented with spots.

The *Coccinellidæ* may be found abundantly on plants, laying their eggs and searching for plant lice, which form their principal food. Many are captured with the beating net at almost every stroke. They are also frequently seen in dwellings and buildings of all descriptions and washed upon the sea shore. Their power of flight is considerable and consequently their distribution is wide spread. The larvæ are long flat grubs, bluish gray in color, with red and black spots, and may be found during the Summer on plants fiercely devouring plant-lice. The eggs are laid in clusters and the young larvæ fall to work on the abundant food near them as soon as they are hatched.

The species thus far recognized on Staten Island, are:—

Cycloneda sanguinea, Linn.

Adalia bipunctata, Linn.

Coccinella 9-notata, Hb.

" *3-fasciata*, Linn.

Hippodamia glaciulæ, Fab.

" *parenthesis*, Say.

" *convergens*, Guer.

Psyllobora 20-maculata, Say.

Megilla maculata, De G.

Brachyzantha ursina, Fab.

Hyperaspis undulata, Say

Several genera are represented by our species, but it is not necessary to go into the generic differences, as the species may be separated without them. The first seven of the above named species are of a tawny yellow color, ornamented with black spots with the exception of the first named, by the number and shape of which they are distinguished, viz:—*C. sanguinea*

has none; *A. bipunctata*, two round ones; *C. 9-notata*, has nine round ones; *H. glaciulæ*, has two round ones and two crescent shaped; *C. 3-fasciata*, has three bands on each elytron; *H. parenthesis* has two round ones, two crescent shaped, which are sometimes only dots, and one diamond shaped at the base of the suture; and *H. convergens*, has thirteen small round ones.

P. 20-maculata, is smaller than the above, is very light in color, sometimes white, and has about twenty small black spots.

M. maculata, is bright red with ten black spots.

B. ursina, is black with ten yellow spots.

H. undulata, is smaller, black in color, with two spots and an undulating marginal border of yellow.

H. convergens is rare. *H. parenthesis* I have found only in meadows near Graniteville. *M. maculata* is found sometimes in large numbers hibernating. I am indebted to Mr. W. T. Davis for the addition *C. 3 fasciata* to my list.

By Dr. Britton, specimens of Oriskany sandstone, containing *Spirifer arenosus*, from the Glacial Drift of Todt Hill, and *Spirifer arrectus* from the same formation at Prince's Bay.

Mr. Hollick remarked that numerous specimens of the common seal (*Phoca color*) had visited our shores during the past month, and read the following extract from the Natural History of New York:—"The common seal, or sea-dog * * * * * is now comparatively rare in our waters, but was formerly very abundant. A certain reef of rocks in the Harbor of New York is called "Robbins Reef," from the numerous seals which were accustomed to resort there—*robin* or *robyn* being the Dutch name for seal." If not disturbed they would no doubt again return to the locality and remain permanently with us, as do the sea-lions on the "seal rocks" of San Francisco Harbor, where they are protected by law.

The speaker also remarked that a single specimen of the Great Northern Diver, (*Colymbus torquatus*) had been noted in the Bay, not far from the Staten Island shore.

A rich find of Indian implements was reported from the neighborhood of Tottenville, but it was not deemed advisable to give a full description of the specimens found, until the locality had been again visited and searched.

Adjourned at 10.45 P.M.

PROCEEDINGS

— OF THE —

Natural Science Association,

OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, April 12th, 1884.

Meeting called to order at 8 30 P. M.

After the reports of officers had been received and other business transacted, Mr Chas. Butler read the paper for the evening:—"Experiments upon cross breeding of moths."

Last July I placed a recently hatched female *Callosamia promethia* out doors in a box covered with a net, in order that I might secure some males of the same species; but to my surprise I caught six male *C. angulifera* within an hour of the time of the first exposure. Had it not been too dark and windy. I could no doubt have captured a large number. The following night I caught five more with a new female, and the next night only one, and no *C. promethia*. I noticed the fact that both of these species are not found about the vivarium at the same time. The *C. promethia* comes in the afternoon, when the sun is still up; a fact that is apparently new, at least to myself. The *C. angulifera* comes after sunset.

The resemblance between the male *C. angulifera* and the female *C. promethia* might cause them to be mistaken for one species; but on examination the former will be found to be of an olive brown, the crescentic markings in the wings are more triangular in their anterior terminations, (hence its name), and the inner border of the posterior wings are nearer a straight line. The latter is more of a copper red. The male *C. promethia* is almost black, except the gray border of the wings, which is alike in both species.

Mr. David Bruce of Brockport says, in a communication, to "Papilio," that a female *Samia ceanothi*, which is from California, hatched by him, attracted the males of *S. cecropia*, in such great numbers that the fluttering of their wings on the glass of the vivarium was mistaken for fire.

Mr. G. R. Pilate of Dayton, Ohio, states that he tied a female *S. Cynthia* out doors over night, in order to obtain some eggs, but was surprised the next morning by finding her attached to a male *S. cecropia*. She layed some eggs, but the larvæ unfortunately died.

Mr. A. J. Cook of Lansing, Mich., had a female *S. cecropia* that attracted a score or more of *S. Columbia*.

Now if *C. promethia* and *C. angulifera* are deserving of specific distinctions on account of color and form, then, for the same reason should *S. cecropia* and *S. Cynthia* be considered as specifically distinct.

The last two moths are from two distant parts of the world; the *cecropia* belongs to America, while the *Cynthia* is from China, as is also the tree upon which its larvæ feeds, namely the *Ailanthus*; yet when they are both brought in contact we find them crossing.

These observations I think go to show that the different species which we find crossing, come from the same stock, and are probably not sufficiently removed to constitute a species, but a sub-species or variety.

This subject is now only in its infancy, and by further research in this direction a great many so called species and varieties will be found to be the result of cross breeding.

In order to make these observations, the entomologist should select a recently hatched female, which according to my experience last summer, is best for attracting the male. Those that have been hatched five or six days, do not attract the opposite sex, even though they may have never before been in contact with a male. This was admirably illustrated by the unsuccessful exposure of a female *Eclis imperialis* which had been hatched five or six days previously, but upon exposing a new female I caught two males. I also had the same experience with *S. cecropia* and *C. promethia*.

A locality that is protected from the wind is not apt to be good, because it is by the odor that the female is discovered. On windy evenings I observed that the moths came from the direction from which the wind was blowing.

Callosamia angulifera is new to the collections of moths of S. I. *C. promethia* is quite common; the cocoons may be found in the Winter, hanging from different trees and shrubs, particularly the sassafras and the button bush.

Mr. Hollicek called attention to the fact that recent operations of the Rapid Transit R. R. Co., had covered up a considerable portion of the granite outcrops at Tompkinsville, just below Nautilus Hall, and that it would soon probably be entirely lost to sight. As this is the only outcrop of true granite on the Island, its location should be placed upon record and specimens carefully kept.

Three flint arrow heads from the vicinity of Bloomfield were presented by Mr. Eadie, and miscellaneous objects of minor interest by other members.

Adjournment at ten o'clock.

PROCEEDINGS
— OF THE —
Natural Science Association,
OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *May 10th, 1884.*

Meeting called to order at 8.30 P.M.

In the absence of the President, Dr. Britton was elected chairman *pro tem*. Three new members were elected and other business transacted, after which Mr. Hollick read a paper upon "Recent discoveries of Indian Implements at Tottenville," as follows:

We are most of us familiar with the fact that in the neighborhood of the old Billop House, Tottenville, there are extensive deposits of oyster and other shells, forming mounds in places, or else lying scattered in beds of greater or less depth over the surface of the fields and gardens. Such deposits are well known in many other places along our coast, and form a continuous chain from Florida to far north of us. They are the remains of successive annual feasts by the Indians who formerly lived here and of the tribes that came from far in the interior. Every year the oyster season was evidently appreciated, if we may judge by the acres of land covered by the discarded shells. No one knows for how many centuries these deposits have been accumulating, or what varying phases of life accompanied them. Implements of war and the chase, domestic utensils, and personal adornments are scattered through them where they were either discarded or lost. Certain of these relics, found recently at Tottenville, I propose to give a brief account of to-night.

The following is a complete list of the different objects thus far found by us:—1 axe, 1 pipe, 5 hammerstones, 10 arrow heads, 37 net sinkers, 7 miscellaneous and innumerable chips and fragments. It is but little more than a year since the first of these was accidentally discovered, while on a field excursion to the locality. Since then, whenever the place has been visited and searched, relics have invariably been found.

The net sinkers and hammerstones I propose to describe in detail to-night, for the reason that they are so abundantly represented, and also because it is only within the past few months that the first of them was found and their former use understood. The net sinkers are merely irregular stones, or smooth pebbles, with notches cut in their edges or angles, the stones generally preserving their natural shape with that exception. Many of them would easily escape notice, and no doubt this is one great reason for their present abundance. The hammerstones are flattened, more or less rounded pebbles, with depressions in the opposite

flat sides. The following abstract, from an article by Mr. Charles Rau, entitled "Indian net sinkers and hammerstones," in Vol. VIII., No. III., of the *American Naturalist*, gives an excellent description of the implements in question:

* * * * The net sinkers * * * * are flat pebbles of roundish or angular (generally indefinite) shape, and of various sizes, which exhibit, on two opposite sides of the circumference an indentation or notch, more or less deep, and produced by blows. Beside the notches, which facilitated the attachment to the nets, these pebbles have not undergone the slightest change by human agency, and their manufacture therefore required but little labor and skill. * * * * No greater skill was required in the manufacture of the hammerstones. They are nearly always roundish or oval pebbles, of somewhat compressed or flattened form. * * * * their only artificial alteration consists in two small pits or cavities, so placed as to form the centres of the opposite broad sides of the pebbles. In these cavities the workman placed the thumb and middle finger of the right hand while the forefinger pressed against the upper circumference of the stone. * * * * Concerning the cavities on the opposite sides, I will state that the makers evidently chiseled them out as it were with a tool of hard stone, doubtless a pointed flint, for which reason they often appear rough and irregular. * * * * In some specimens the depressions are so shallow that they almost escape observation. * * * * Yet quite a number of the hammerstones * * * * exhibit, instead of the cup shaped cavities, * * * * roughly ground faces, sometimes several inches in diameter and answering well the purpose of allowing the hand a secure grasp of the stone. * * * * That these latter were employed as hammers cannot be doubted, since they show the most distinct traces of violent contact with hard substances." Our own hammerstones, with two exceptions, are made of soft sandstone, evidently with no intention of using them upon any hard substance, and I have no doubt whatever that in our locality they were used in cracking the oysters whose shells they are so plentifully mixed up with. Muncy, Pa., where Mr. Rau found his specimens, is on the banks of the Susquehanna, and no doubt shell fish were caught and eaten there as at Tottenville, but this explanation of the use of the hammerstones does not seem to be insisted upon by him.

Our specimens are made of such soft stone that I can hardly imagine any other use to which they could be put. The number of net sinkers in use must have been immense, as even at the present time, upon the surface of the ground, they may be picked up in considerable number. One day, in about half an hour, fourteen were found. The extent of these shell heaps can only be computed in acres, and of their depth we know nothing, but there is not the slightest doubt that under the surface these and other relics of great historical value and interest are to be found in even greater numbers. An encouraging fact that should be borne in mind is that up to the present time we have found all our relics by merely glancing over the surface of the fields. A systematic series of excavations if permission could be obtained, would without doubt amply repay us.

Mr. George F. Kunz, of New York, who was present by invitation, then presented the stone head found near Clifton, and gave the following account of the same:—

About one month ago my attention was called to a rumor in regard to the finding of a curious stone head on Staten Island, which I immediately investigated, and arrived at the following facts:

About 30 feet east of the railroad, just above the Fingerboard road, in Southfield, is a low swamp which a few years since was covered with trees and is now filled with the roots of the swamp oak. A rustic basket worker, named James Clark, came upon the stone head while digging up the roots of a high huckleberry bush, (*Vaccinium corymbosum*,) at least ten years of age, growing at the edge of the swamp. The soil is a compact, light creamy brown, sandy clay in which a stone like this could be buried for an age without much disintegration. When striking in his pick, at a depth of from 12 to 18 inches, he turned up the head—his pick striking and indenting the chin. It was at once thoroughly scrubbed and narrowly escaped painting by the enthusiastic finder and his friends.

As now preserved it shows the material of which it was formed to be a brown sandstone, apparently more compact than the common New Jersey sandstone, and composed almost entirely of grains of quartz with an occasional small pebble, one of these measuring $\frac{1}{8}$ inch across, is on the bridge of the nose, and another, a little smaller, in the centre of the forehead.

The weight of the head is about 2 lbs., its height 7 inches, and measures 4 inches through the cheeks, 6 inches from the tip of the nose through to the back of the head, and $1\frac{1}{2}$ inches across the nostrils.

The eyes are $1\frac{1}{4}$ inches long, and $\frac{5}{8}$ inch wide. They are raised in the centres and have a groove running around close to the lids.

A round hole $\frac{1}{8}$ inch deep had been drilled in the lower part of the nose in the space between the two nostrils, evidently

designed for a nose ornament, and both nostrils were hollowed out.

The cheeks in their lower part are sunken in a very curious manner, causing the cheek bones to stand up very high. The forehead is low and retreats at an angle of 60° . A trace of what had been or was to be the ear is perceptible on the right side.

The back and upper parts of the head are almost entirely rough and unworked, as if it had never been finished, or was originally a part of some figure.

The surface is rough and slightly weathered, the cheeks, forehead and chin having single grains of sand apparently raised above the surface as if by age and exposure. The discoverer, in cleaning it, had scraped the eyes and beneath the nose with a nail, and his shovel had formed quite a groove in one of the cheeks, all of which scratches or marks have a very different appearance to the general surface, and are plainly recent.

The spot where the head was found is so unfrequented, there being no house in the immediate vicinity, and the authenticity of its finding being duly attested, we are left to such conjecture as to its origin as the object itself suggests.

The features are too well cut for a common off-hand piece of work by a stonemaker; the style is not Egyptian or Eastern; rendering it unlikely that it is a part of an antiquity thrown away by some sailor; it is rather Mexican, and still more resembles Aztec work.

This leads to the inference that it is probably of Indian origin, or if not, it is remotely possible that it was made by the early Dutch.

In connection with the stone head the following affidavit was also presented and will be preserved with it:—

CITY AND COUNTY OF NEW YORK, ss:

James Clark, of Stapleton, Staten Island, N. Y., being duly sworn, deposes and says that the stone head sold by me, was not made by me, buried by me, or to my knowledge made or placed where found to my knowledge by any one else. The head was found in the latter part of February, 200 feet from the railroad track, near Fingerboard road, under a blue huckleberry bush, near the edge of a swamp, about 18 inches under the soil.

Sworn to before me this } JAMES CLARK.
fifth day of May, 1884. }

HENRY FELDMANN,

Notary Public,
New York.

Mr. Chorlton presented an extensive series of Indian relics from the mounds of Florida, donated by Mr. James Fry, of Palatka, but owing to the lateness of the hour an extended description was postponed.

Mr. James Raymond presented an arrow head found at West New Brighton, and Dr. Britton exhibited the bones and teeth of a deer, found in the shell mounds at South Amboy, N. J.

Adjournment at 10.45.

Mch. 1986

PROCEEDINGS

— OF THE —

Natural Science Association, OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, June 14th, 1884.

Meeting called to order at 8 P.M.—After the transaction of the usual business, the following material of general interest was presented:

By Mr. Seehusen, a large piece of pumice stone, picked up in the Straits of Sunda, immediately after the late eruption.

By Mr. Chorlton, specimens of continental money and other relics of colonial times, donated by Mr. Jas. Fry. Local matter was then presented as follows:

By Mr. B. J. Carroll, photographs of the stone head found near Concord, which was discussed at the last meeting.

By Mr. Davis, a male specimen of *Citheronia regalis*, with a pupa and larvae in various stages of growth. The larvae were found upon the sweet gum, (*Liquidamber styraciflua*,) upon which it seemed to occur more numerous than upon either the hickory or walnut. One variety of the larvae was of a reddish brown color, instead of the ordinary ground color of green—the black markings being the same. The speaker then stated that he had completed a list of the butterflies of the Island, and that a printed copy would be sent to each member.

By Mr. Leng, the following beetles new to the Island:—*Omophron americanum*, Dej., captured in June by pouring water on the grassy banks of a small brook. They hide among the roots, and are dislodged by the water.

Elaphrus ruscarius, Say., taken late in April and early in May, running on mud flats of R. R. cut near Richmond.

Clirina americana, Dej., one specimen taken in May under the stones on edge of a brook.

By Mr. Eadie, a stone pestle and flint knife from Watchogue.

By Messrs. Raymond, Corse and Hollick, about 80 specimens of Indian implements, consisting of hammer stones, net

sinkers and arrow heads, with some fragments of pottery and flint chips, the result of two field day excursions at Totterville, since the previous meeting. The supply seems almost inexhaustible, quantities being turned up whenever the fields are plowed. Also three arrow heads from West New Brighton.

Mr. Gratacap called attention to the circular of the American Ornithological Union in regard to the English sparrow, notes upon which are desired by Dr. Holder, of the American Museum, New York. Mr. Chorlton remarked that he remembered the first colonies of these birds on Staten Island, in the Lombardy poplars, near Stapleton Park, and at the DeGroot house, West New Brighton. Most of these trees are now gone.

Mr. Sawyer noted a crow's nest containing 6 eggs, the average number being only 4. The red shouldered hawk was described as being very plentiful, 3 nests having been found this year, all of them close to the same localities where nests of this species had been found in previous years. Mr. Hollick remarked that he had known them to occupy the same nest for two successive years, even after having been disturbed.

Attention was called to the fact that on May 30th considerable damage was done in many parts of the Island by frost, which strange phenomenon should be placed upon record. Amongst the forest trees, the hickorys seemed to suffer the most, many of them having the leaves blackened and shriveled as if by fire.

Adjournment at 10 P.M., until the second Saturday in Sept., informal meetings only to be held during the Summer.

Errata. In April proceedings for "*Promethia*" read *Promethea*, for "*Eclis*" read *Eacles*, and in fourth paragraph from the last read, towards which the wind was blowing, instead of "from which"—&c.

PROCEEDINGS

— OF THE —

Natural Science Association,

OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *Sept. 13th, 1884.*

Meeting called to order at 8.10 P.M.

Mr. Wright elected temporary chairman.

The regular business of the evening having been transacted, Mr. Gratacap made the following remarks upon Silver Lake, illustrated by means of diagrams.

Silver Lake, so well known as a popular resort on Staten Island, has enjoyed for a long time some sensational importance from its reputed great depth, &c. It occupies a bowl shaped depression between the elevated dome of serpentine, known as Grimes' Hill, and the low ridge forming the uplands south of Castleton avenue, while on the north and south a low divide formed of drift deposits separates its water from the lower levels about it. Its shores are neither precipitous nor rocky, and its water is turbid and opaque. The glacial detritus which mantles the surrounding region presumably forms its floor, and springs, intermittent and superficial, assisted by considerable surface drainage, are the source of its water supply. Some examinations of its depth, with the assistance of Mr. Ernest Congdon, and of the temperature of surface and bottom water appears to reduce it to the level of a very ordinary pool. Nine soundings, along the line of greatest length, progressively from the north end to the south end of the lake, were respectively 8 ft., 9 ft., 10 ft., 3 in., 15 ft., 16 ft. 2 in., 16 ft. 6 in., 16 ft. 1 in., 10 ft. 3 in., and 6 ft. 6 in.

A second section, near the east shore, gave in the same direction, 7 ft., 9 ft. 4 in., 12 ft. 2 in., 14 ft. 6 in., 14 ft. 4 in., 12 ft. 3 in., and 5 ft. 6 in. A third section, on the west shore, similarly afforded 7 ft. 6 in., 8 ft., 8 ft. 10 in., 9 ft. 2 in., 10 ft. 6 in., 10 ft. 10 in., 9 ft. 3 in., 7 ft. 3 in., while a cross section west to east gave 5 ft. 9 in., 9 ft., 14 ft., 16 ft. 6 in., 16 ft. 2 in., 15 ft., 8 ft., 3 ft. 6 in. Graphically represented, these measurements describe the contour of the depression, as an elliptical platter, deepened disproportionately on

its eastern and southern borders and sloping to the west and north with more shallows depths. The springs which seem located upon the east shore may arise from a water bearing sand or gravel stratum, sealed in by impervious clay beds, as the glacial drift is here all more or less modified and reassorted by water action.

The temperature of the surface water was 76° Fah. with bottom temperature (rather rudely determined) of 75° at the most shallow point, through 73°, 72°, 71°, to 70° at the deepest. The depth and temperature of the spring holes, if such they are, were not observed, as they could not be located. In this connection some bottom temperatures of famous lakes may prove suggestive, Loch Lomond at 600 ft. 42° F., Lake Geneva at 950 ft., 41° 7 F., Lake Sabastino at 450 ft., 44° F.

Dredging revealed no molluscous life, nor any sandy, rocky, nor pebbly bottom; a bare indication of gravel excepted. The contents of the dredge was soft black mud, which near the shores was filled with leaves, twigs, decayed wood and earth worms, (*Lumbricus*.)

At the close of his remarks Mr. Gratacap stated that any information relative to the wells of Staten Island would be prized by him. The chief points of consideration being their depth to water line and to bottom, the temperature in Winter and Summer, and the strata through which the well was bored, and the one which carries the water.

Mr. James Raymond referred to a robin's nest found by him, in which the eggs were speckled instead of clear blue. In Coue's "Key to N. A. Birds," he says, "eggs sometimes spotted." In this particular case they were thickly covered with brownish speckles. He also noted a deserted wasp's nest in his garden, in which a common house wren had built.

An old English hunting knife with the blade broken, and the horns and bones of what probably belonged to a young specimen of the red deer, were shown. These objects of Revolutionary times were found together on Fort Hill, in the garden of Mr. Wm. Oliffe, who presented them to the Association. Attention was called to the frost of June 14th. Its effect upon the beech trees was particularly cited, the leaves becoming curled and browned on the margins.

Adjourned at 9.15 P.M.

8157

March 19

PROCEEDINGS

— OF THE —

Natural Science Association,

OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *Ort.* 11th, 1884.

Meeting called to order at 8 P.M. Dr. Britton elected secretary *pro tem.* Mr. Hollick gave the following description of recent discoveries in the shell mounds near Tottenville and Kreischerville:

New ground having been broken in several places not before visited, search was made from time to time during the Summer, with very satisfactory results. Some 150 implements were found, consisting of net sinkers, hammerstones, arrow-heads, &c. The chief objects of interest were discoidal and perforated shuttle-shaped stones, probably used as ceremonial implements. The discoidal stones have the opposite flat faces either ground roughly or else polished, and are of hard quartzite. The only shuttle-shaped stone found is composed of soft banded slate. Mr. Gratacap stated that similar objects, made of the same material, were found in the mounds of Ohio and Illinois, from which region our specimen probably came, as there is no such material in this neighborhood. Another theory in regard to these stones is that they were used for bow-string shapers—the string of sinews or hide being drawn through the hole to render it uniform and compact. Many perforated oyster and clam shells were found, which had doubtless been used as ornaments. Evidences of fire places were noted in several of the mounds, specimens of cracked and partly fused stone having been found. In some of the stones the surface was entirely fused into a glass-like slag. A fine stone axe, found by Mr. Davis, completed the list of objects. Mr. Hollick also mentioned a visit made to the shell mounds at Glen Cove, L. I., and showed some implements found there, similar to those from Tottenville.

Mr. Congdon presented a catalogue of the Rhizopoda of the Island, consisting of

61 species, which was ordered printed as soon as practicable, as part of the proceedings.

Mr. James Raymond showed a peculiar malformation in the upper mandible of a robin, which was elongated $\frac{3}{8}$ in. beyond the lower one, curved and constricted throughout. Dr. Carroll stated that it was probably due to some injury which had caused an unequal and more rapid deposition of material along the upper surface of the mandible.

Mr. Davis exhibited a specimen of a grasshopper, (*Conocephalus dissimilis*) which he had found without a head, and stridulating on a grass stem. When touched by the finger the insect did not close its wings in the usual way, but allowed them to remain far apart. The muscles in the thorax at first looked healthy, but gradually the tissues dried and on the third day of its captivity it died, without having stridulated again, though every means thought of were employed to induce it. He called attention to the location of the sense of bearing in the abdomen, and suggested that if it had been in the head and that being gone, perhaps the insect would not have stridulated. The fact that many Lepidopterous insects having the antennæ cut off drop helplessly to the ground, being no longer able to guide their flight, seems almost a parallel to the supposed case.

Dr. Carroll gave a brief account of the geological features in the neighborhood of Belfast, Ireland, and Folkstone, England, illustrated by specimens.

Announcement was made that a field day excursion would probably be arranged for Nov. 4th, to Prince's Bay, in which the Torrey Botanical Club, New York Microscopical Society, Brooklyn Entomological Society and others would be invited to participate.

Adjournment at 10 15 o'clock.

Mich. 1996

PROCEEDINGS

— OF THE —

Natural Science Association, OF STATEN ISLAND.

Extra No. 1.

October, 1884.

THE REPTILES AND BATRACHIANS OF STATEN ISLAND.

Owing to the number of errors in the previous lists of Reptiles and Batrachians of Staten Island, and the additions to our fauna, a new one has become desirable.

In geographical distribution some of the reptiles are almost confined to the Cretaceous and those portions of the Island covered by marine alluvium. I have seen but one specimen of *H. platyrhinus* on the serpentine formation, that being near the highest point. *C. pennsylvanicum* seems to be restricted to the shallow pools near the salt water. It occurs near New Dorp, Richmond Valley station and Watchogue. *Ophibolus triangulus* is rather a scarce serpent on Staten Island. Mr. Hollick and myself, on the 22d of August, found the eggs containing young and empty shells from which they had emerged, in the sand near Kreischerville. Five young taken from the eggs measured from 1 to 1 $\frac{1}{10}$ ft. *Rana halcinea* though found in other portions of the Island is much more common on the marsh land near Watchogue. The species of *Diemictylus* have only been observed in the hilly districts. In 1881 the "spade foot" frog made its appearance in some numbers, but it has not been since seen.

WM. T. DAVIS.

REPTILIA.

TESTUDINATA.

- Cistudo clausa*, Gm.
- Nanemys guttatus*, Schn.
- Chrysemys picta*, Herm.
- Malacoclemmys palustris*, Gmel.

- Cinosternum pennsylvanicum*, Bose.
- Chelydra serpentina*, L.
- Chelonia mydas*, L.

OPHIDIA.

- Heterodon platyrhinus*, Latreille
- Tropidonotus sipedon*, L.
- Storeria dekayi*, Holbr.
- Eufaenia saurita*, L.
- “ *sirtalis*, L.
- Bascanium constrictor*, L.
- Liopeltis vernalis*, Dekay. E. A. Neilson and H. A. Wheeler.
- Diadophis punctatus*, L.
- Ophibolus dolatus*, var. *triangulus*, Boie.

BATRACHIA.

ANURA.

- Rana halcinea*, Kalm.
- “ *palustris*, Le Conte.
- “ *clamitans*, Merrem.
- “ *temporaria*, L.
- Scaphiopus holbrookii*, Harlan.
- Hyla versicolor*, Le Conte.
- “ *pickeringii*, Holbrook.
- Acris gryllus*, Le Conte.
- Bufo lentiginosus*, Shaw.

URODELA.

- Diemictylus viridescens*, Raf.
- “ *miniatus*, Raf.
- Desmognathus fusca*, Raf.
- Hemidactylium scutatum*, Schl.
- Plethodon erythronotus*, Green.
- “ *glutinosus*, Green. E. F. Neilson.
- Spelerpes lilineatus*, Green.
- “ *ruber*, Daudin.
- Amblystoma opacum*, Gravenhorst.
- “ *punctatum*, L.

Nov 11 1884

PROCEEDINGS

— OF THE —

Natural Science Association,

OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, Nov. 8th, 1884.

Meeting called to order at 8.15 o'clock.

This being the fourth annual meeting, reports of officers for the past year were read and approved as follows: The treasurer reported a balance of \$78.00 in the treasury and no outstanding debts. The curator reported about 568 objects donated to the cabinet and 29 books and pamphlets to the library, besides such as were added by exchange and purchase. The recording secretary reported 50 active members on the roll and an average attendance of 18 at each meeting. The corresponding secretary read a list of the numbers of various scientific periodicals containing notes and references to the work of the Association; and also gave a brief account of the correspondence for the year with results.

The following officers were elected for the ensuing year:

President, A. L. Carroll, M.D.; Treasurer, Samuel Henshaw; Curator, Wm. T. Davis; Recording Secretary, Charles W. Leng; Corresponding Secretary, Arthur Hollick.

Dr. N. L. Britton then presented "Notes on the Moraine at Prince's Bay," illustrated by specimens.

His remarks were in substance, as follows: The bluff on which the light-house stands at Prince's Bay, is a prominent feature in the topography of the neighborhood. It is probably the best exposure of Glacial Drift that we have in the vicinity of New York, for here the terminal moraine of the great North American Glacier has been cut down through the greater part of its thickness, for a distance of nearly a half mile along the shore leaving a steep bluff, which reaches some 75 feet in height, filled with pebbles, stones and boulders of transported materials, among them some brought from at least 200 miles to the north, and many smoothed and rounded and bearing the characteristic scratches and groovings which it is well known

that moving ice masses only produce. Here, for example, were found the Lower Silurian Potsdam Sandstone with the fossil worm *Scolithus*; the Lower Helderberg Limestone, with other well known fossils; these are found in places in Northern New York; also Gneiss rocks, probably originating in the New Jersey Highlands; and, most abundant, the red sandstone and trap rocks of Northern New Jersey. This part of the moraine was evidently deposited under water, as it shows well-marked lines of stratification, differing in this from glacial deposits further inland. The most interesting feature of this hill is, however, one which had hitherto escaped our notice. I refer to the masses of Cretaceous plastic clays with the overlying Yellow Gravel, so well displayed about Kreischerville and known to underlie the Glacial Drift throughout Southfield and Westfield, here *unbedded in the moraine*, proving conclusively that in its southward movement the glacier scooped out portions of the strata over which it flowed, and enclosed them in the mixed load of stones, clay and sand which it carried and deposited. I have seen a similar structure at Woodbridge, N. J., but at Prince's Bay it is equally well shown.

The Yellow Gravel here alluded to covers the surface of New Jersey south of the area of glaciation and is known to be more ancient than the Glacial Epoch. We have it on Todt Hill, overlying the iron ore deposits, at an elevation of some 200 ft., and as it is a water deposit, we have proof that at the time of its deposition the Island stood more than 200 feet lower than it now does, and by far the greater portion of it was submerged.

Mr. C. W. Leng reported that he had found the beetles *Coptocycla clavata* and *Lema trilineata* feeding on the potato, and that he had lately caught the following, new to the Island: *Odontota rubra* and *Cyrtinus pygmaeus*.

Adjournment at 10.30.

PROCEEDINGS

— OF THE —

Natural Science Association,

OF STATEN ISLAND.

Extra No. 2.

November, 1884.

RHIZOPODS OF STATEN ISLAND.

CLASS—RHIZOPODA.

ORDER—PROTOPLASTA.

SUB-ORDER—PROTOPLASTA LOBOSA.

- Amæba Proteus*, *Leidy*.
 “ *Verrucosa*, *Ehrenberg*.
 “ *Radiosa*, *Ehrenberg*.
 “ *Villosa*, *Wallich*.
Dinamæba Miriabilis, *Leidy*. Rare.
Pelomyxa Villosa, *Leidy*.
Diffugia Pyriformis, *Wallich*.
 “ “ *n. var.*
 “ *Compressa*, *Carter*.
 “ *Vas*, *Leidy*.
 “ *Cornuta*, *Leidy*.
 “ *Nodosa*, *Leidy*.
 “ *Olla?* *Leidy*.
 “ *Cratera* *Leidy*.
 “ *Acuminata*, *Ehrenberg*.
 “ *Urceolata*, *Carter*.
 “ *Lobostoma*, *Leidy*.
 “ *Arcula*, *Leidy*.
 “ *Globulosa*, *Dujardin*.
 “ *Cratera*, *Leidy*.
 “ *Corona*, *Wallich*. Rare.
 “ *Constricta*, *Ehrenberg*.
 “ *Spiralis*, *Ehrenberg*.
 “ *Cassis*, *Wallich*.
 “ *Marsapiformis*, *Wallich*.
Hyalosphenia Cuneata, *Stein*.
 “ *Elegans*, *Leidy*.
 “ *Papilio*, *Leidy*.
 “ *Tincta*, *Leidy*.
Nebela Collaris, *Leidy*. Rare.
Quadrula Symmetrica, *Schulze*. Rare.
Heleopera Picta, *Leidy*.
Arcella Vulgaris, *Ehrenberg*.
 “ *Angulosa*, *Ehrenberg*.
 “ *Discoides*, *Ehrenberg*.
 “ *Mitrata*, *Leidy*.
 “ *Atocrea*, *Leidy*.
 “ *Dentata*, *Ehrenberg*.
Centropyxis Aculeata, *Stein*.
 “ *Ecornis*, *Ehrenberg*.
Cochliopodium Bilimbosum, *Leidy*. Rare.

SUB-ORDER—PROTOPLASTA FILOSA.

- Pamphagus Mutabilis*, *Bailey*.
 “ *Hyalinus*, *Leidy*.
Pseudodiffugia Gracilis, *Schlumberger*.
 Rare.
Cyphoderia Ampulla, *Leidy*.
Sphenoderia Lenta, *Schlumberger*.
Euglypha Alveolata, *Dujardin*.
 “ *Ciliata*, *Leidy*.
Assulina Seminulum *Leidy*. Rare.
Trinema Acinus, *Dujardin*.

ORDER HELIOZOA.

- Actinophrys Sol*, *Ehrenberg*.
Raphidiophrys Elegans, *Leidy*. Rare.
Acanthocystis Chætophora, *Leidy*.
 “ *Spinifera*, *Greeff*.
 “ *Aculeata*, *Hertwig*.
Clathrulina Elegans, *Cienkowski*. Rare.
 Has been found only in Silver Lake.
Hyalolampa Fenestrata, *Greeff*. Very rare.
 Three specimens found in a small pool
 in Harbor Woods.
Vampyrella Lateritia, *Leidy*.
Hyalodiscus Rubicundus, *Leidy*. (?) Rare.
Diplophrys Archeri, *Barker*. Rare.

ORDER—FORAMINIFERA.

- Biomyxa Vagans*, *Leidy*. Rare.
Gromia Terricola, *Leidy*. Rare.

The above list comprises all the species of Rhizopods which have been found on Staten Island during the past three years, and may be considered as very nearly complete. There are a few species found in New Jersey, which by careful search may be found here, although so far they have escaped observation. Localities have not been given, as the Rhizopoda, being microscopic organisms, are very widely distributed.

ERNEST A. CONGDON.

PROCEEDINGS OF THE NATURAL SCIENCE ASSOCIATION, OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON,
Dec. 13th, 1884.

Meeting called to order 8.20 P M.

The paper of the evening, by Mr. Leng,
was on

THE CARABIDAE OF STATEN ISLAND. PART I.

The *Carabidae* are a family of *Coleoptera* distinguished by the possession of the following characters: Tarsi, 5-jointed; first three ventral segments connate; first divided by the hind coxal cavities, so that the sides are separated from the very small medial part; antennae, 11-jointed, arising at the side of the head between the base of the mandibles and the eyes.

They are terrestrial in habit and vary greatly in size, form and color. In size from $\frac{1}{16}$ to $1\frac{1}{2}$ inches; in form have the graceful shape of *Cicindela* with every conceivable modification to rounded form water beetles; in color the variety is indescribable.

They live mostly upon animal food and are therefore beneficial to man. They are very active in habits, and many are found hunting fiercely on plants for the smaller insects and worms which form their prey. The *larvae* so far as known are whitish, powerful jawed animals, distinguished from other *larvae* by the double claws of the feet.

The family may be divided into two divisions: The first, *Carabinae* has the middle coxal cavities not entirely enclosed by the sterna, so that the epimeron of the mesosternum reaches the coxae. The species that have been found on Staten Island belonging to this division are:

Omophron americanum, Dej. It is readily known by its quite circular form. Color, yellowish with green markings. Length, $\frac{1}{4}$ inch. It is found rarely amongst grass and weeds at the edge of running streams and is most easily captured by pouring water upon the bank and drowning out the beetles.

Elaphrus ruscarius, Say. Shaped like *Cicindela* with the same prominent eyes. The elytra are without the usual longitudinal lines, but are marked with deep, large circular holes. Found near half dried up mud pools; running in the sun. Not common.

Notiophilus aeneus, Hb. A small shining insect with prominent eyes and parallel sides. Dark brown bronze in color. Length, $\frac{1}{4}$ inch. Found in early Spring among damp leaves, and during Summer under chips of wood. Not common.

Nebria pallipes, Say. Of the typical Carabine form, rounding elytra and margined prothorax. The legs are always very pale yellow, and the elytra varying light or dark brown. Length, $\frac{3}{4}$ inch. Found near brooks or ditches among leaves, stones, &c. It is numerous at certain places on Staten Island, though quite rare elsewhere.

Calosoma scrutator, Fab. This is one of the handsomest beetles in the world. The

color is metallic green, and in length it reaches $1\frac{1}{2}$ inches.

To the same genus belong

C. Wilcoxi, Lec. Smaller and a little different in color. One specimen has been captured by Mr. Davis. Length, $\frac{3}{4}$ inch.

C. calidum, Quite a common insect. Color, black, with rows of golden spots. Length, $\frac{7}{8}$ to 1 inch.

The genus *Carabus* is distinguished from the above by having the third joint of the antennae cylindrical instead of compressed. Three species have been found.

C. serratus, Say. By Mr. Davis.

C. limbatus, Say. Rarely.

C. vinctus, Web. Very common.

C. serratus is violet in color and has the upper part of the elytral margin serrated like a saw. *C. limbatus* is black, slightly tinged with blue, and *C. vinctus* is black bronze in color. Each is about an inch in length. They are further distinguished by the sculpture of the elytra.

The genus *Cychrus* contains three of our most beautiful beetles. They resemble the above, but are more rounded, and the head is longer. They are believed to live principally on snails, their elongated head being well adapted for drawing the animal from its shell. The species are:

C. Lecontei, Dej. Smaller, black, tinged with blue.

C. elevatus, Fab. Purple.

C. viduus, Dej. Blue.

The first is about $\frac{5}{8}$ inch long; the others about an inch. All are rare, of *viduus*, I have found only two specimens. The species of these three allied genera will be found most readily in early Spring under stones and logs. The *Calosoma* and *Carabus* probably live from year to year.

Scarites subterraneus, Fab., is a black beetle found under stones or in the ground into which he digs with great rapidity. The thorax is very square and the feet very broad. He is able to feign death by stiffening the joints. Length, $\frac{3}{4}$ inch. Very common.

Cicindela americana, Dej., is a small brookside dweller, resembling the above very closely except in size. He may be captured by pouring water on the banks of brooks. Rare on Staten Island. Length, about $\frac{1}{4}$ inch.

C. bipustulata, Fab. Larger than *americana* and ornamented with two red spots. Length, about $\frac{5}{8}$ inch. For this addition to Staten Island we are again indebted to Mr. Davis.

It will be observed that the noticeable feature of Staten Island's Coleopterous fauna is the great scarcity of semi-aquatic species. All but one or two of those known to occur in this vicinity are in our list except the species which live near ponds and brooks, and it is desirable that members should devote some time to searching for them next season so that we may know if our Island is really without these species.

Mr. Davis exhibited a specimen of *Cicindela scutellaris*, var *modesta* as a new beetle to the Island. Four specimens were taken by himself and Mr. Weeks on Oct. 12, at Tottenville.

Adjournment at 10 P.M.

March 19/86

PROCEEDINGS

— OF THE —

Natural Science Association, OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, Jan. 10th, 1885.

Meeting called to order at 8.50 P.M.

In the absence of Mr. Leng, Mr. E. A. Congdon was chosen secretary *pro tem*.

President Carroll announced that he had taken steps to have the Association incorporated, and that he hoped by the next meeting this would be accomplished.

Mr. Sanderson Smith offered a few remarks on deep sea dredging; the facts mentioned being observed by him on the recent trips of the U. S. Fish Commission steamer "Albatross"

It proved a very difficult matter to keep the animals brought from great depths alive; in fact, about the only organisms that could withstand the changes were the sea anemones, and some of these were kept for a considerable period. Their colors were very beautiful, some being bright red or orange, others black or white. It has been suggested that the brilliant colors of these animals living at great depths render them practically invisible to others which use them for food, as only blue, or bluish green light penetrates through so vast a thickness of water. Their mode of fastening or holding themselves to the bottom is of great interest. In the absence of many rocks or other objects to which they could securely attach themselves, they accumulate a ball or mass of mud, which is surrounded by the foot, and the animal, in consequence of this weight, is securely anchored to the bottom.

Mention was made of the very unequal distribution of life over the ocean bottom, even at the same depth, a single species often monopolizing a considerable area, to the almost complete exclusion of others. The presence of rounded boulders on the

ocean bottom and their probable origin by means of floating ice was remarked upon, as also the very gentle slope of the bottom for about 100 miles off the coast and the almost precipitous descent to 2,000 or 2,500 fathoms soon after passing the 100 mile line, which marks the real eastern edge of the North American Continent. The valley of the Hudson River has been traced across this submerged shelf in a southeastwardly direction from Sandy Hook, in the form of a trough, in which the depth of water is appreciably greater than over the surrounding areas. Dr. N. L. Britton remarked on the bearing of these facts to the former eastward extent of Staten Island. In former times, when the continent stood higher, the southern shore of the Island reached eastward to the western edge of the main channel, which indicates an erosion of from three to six miles along this shore. This erosion is still in progress, at the average rate of about six feet annually.

The shells of the common oyster (*Ostrea borealis*), taken from the borings of *Teredo*, in a log at Prince's Bay, were exhibited by Mr. W. T. Davis. The oysters had grown within the tunnels made by the borer and had in one instance followed the branching of the tunnels, forming a curiously Y-shaped oyster-shell.

Mr. Henshaw exhibited a portion of an old flint lock and some iron buttons found near the revolutionary encampment on Fort Hill.

A committee was appointed to arrange a course of public lectures, to be delivered under the auspices of the Association.

Adjournment 10.30 P.M.

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PROCEEDINGS

— OF THE —

Natural Science Association,

OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, Feb. 14th, 1885.

Meeting called to order at 8.30 o'clock. A quorum not being present, the time was occupied exclusively with the discussion of scientific matters.

Mr. Hollick called attention to recent paragraphs in the New York and local papers in regard to the finding of peat on the Island, stating that the accounts were liable to lead to misapprehension on the subject, as peat has always been known to exist here, but not in sufficient quantity to be of any economic value. The following account was then given of the peat bogs in the vicinity of Richmond:

The bogs occupy depressions in the low range of morainal hills of the neighborhood, and are not very deep—the peat being only about three feet in thickness where examined, although in places it may be more and often exhibiting the phenomenon of “quaking”—indicating water or very soft mud underneath. The formation of the bog is due to the character of the surrounding ground, which is drift, composed of alternate strata of sand, gravel and clay. If below the bottom of one of these depressions there is a clay stratum it becomes a basin for the reception and retention of water—the clay being impervious to water. Aquatic and semi-aquatic plants take advantage of the circumstances, and their roots, leaves and branches, decaying year after year, form a thick black mud, which frequently entirely chokes up the swamp. When the peat, moss or sphagnum takes possession of this the formation of the peat commences, its composition being almost exclusively of the decayed and living plants of that genus. In our bogs the commonest species seem to be *Sphagnum cuspidatum*, Ehrh. and *S. cymbifolium*, Ehrh. The resulting peat supports a vegetation peculiar to itself—many of the accompanying plants not being found elsewhere. Amongst these are *Eriophorum Virginicum*, L., *Scirpus Eriophorum*, Michx., var. *laxus*, Gr., *Juncus articulatus*, L., and *Vaccinium macrocarpon*, Ait. This latter is the common cranberry, and it grows so luxuriantly—forming a perfect mat in places—that it suggests a possible use to which these bogs might be put. The bogs have many of them disappeared in late years, having been drained and transformed into cultivated fields, their rich black mold scattered over the adjacent land for fertilizing purposes and their interesting flora exterminated. Before long the only evidence we shall have that these

plants flourished on our Island will be in the records and herbariums of our botanists.

Mineralogically there is also much that is of interest, particularly the bog iron ore or limonite, which has been lately and is now in process of formation. The surrounding earth is strongly impregnated with iron, as may be seen by its color and also by the transported blocks of iron ore that are scattered about. This is all in the form of limonite, which is a hydrated sesquioxide of iron, insoluble in water. When, however, this is washed into the streams and brooks and comes in contact with the decaying organic matter, such as leaves, &c., these latter supply carbon, which takes up considerable of the oxygen, reducing the iron oxide and at the same time liberating carbonic acid gas, which may be seen bubbling to the surface. The iron at the same time is acted upon by the organic acids present (carbonic, humic, crenic and apocrenic,) and more or less brought into solution. In this form the iron is carried along until it reaches some stagnant situation, like our bogs, where exposure to the atmosphere oxydises it again, and, in company with such as was carried along in mechanical suspension, it precipitates and falls to the bottom as a rusty looking flocculent mass, or forms a thin, filmy, oily looking scum on the surface. If it comes in contact with enough organic matter it will of course be redissolved, but if it falls upon gravel or sand, such as always occurs below our bogs, it hardens in time and cements the stones and pebbles into masses such as are actually found. Where drains have been cut through, or the bottom exposed in other ways, these masses may be picked up in abundance and almost any spring or pool in the vicinity will afford samples of the oily looking scum or rusty precipitate.

Dr. Carroll remarked upon the well known fact that people living in peat districts are remarkably free from malarial diseases. Peat is possessed of considerable antiseptic qualities and has an acid reaction, while the soils of most malarial districts are either very faintly acid or else neutral. These facts may prove the basis for valuable future researches in regard to the origin of malaria.

The committee on public lectures announced that the next would be by Dr. W. Hailes, of Albany, on Saturday, Feb. 21. Subject—“The microscope and its uses.”

Adjournment at 10 o'clock.



PROCEEDINGS

— OF THE —

Natural Science Association, OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *March 14th, 1885.*

Meeting called to order at 8 30 o'clock. The resignation of Mr Charles W Leng, as Recording Secretary, was read and accepted, and Mr. Ernest A. Congdon was duly elected to fill the vacancy.

The incorporation of the Association was announced, and also that printed copies of the certificate of incorporation had been prepared for distribution to the members.

Mr. L. P. Gratacap read the following paper upon "Chlorides in the Rain fall of Staten Island, for 1884:"

We are apt to regard the rain solely as a source of water supply, and overlook an important function which it performs in bringing to us information about the chemical and sanitary condition of our atmosphere. Its solvent powers cleanse the air through which it falls of various substances contained therein, and it also mechanically carries to the earth, in its descent, various other insoluble matters. When we consider the great quantity of material which, by natural and industrial processes, is being continually discharged into the air, we may expect to find our rain a really complex liquid. The enormous consumption of coal in our houses and factories spreads through the air fumes, from which are derived, by oxidation, sulphuric and hydrochloric acids with finely divided ash particles; these reach the upper strata of the air, and are returned to the earth in our rainfalls as sulphates and chlorides and insoluble dust with free acids, which corrode the stonework of buildings and exert an injurious effect upon vegetation. The decomposition of organic matter, vegetable and animal, is a source of ammonia, sulphuretted hydrogen, carbonic acid and other compounds, some of which, undergoing oxidation, become nitrates and sulphates and furnish appreciable amounts of fertilizing bodies to the soil to which they are returned in the showers and rains. Beside all these there are minute organisms, mineral crystals and cosmic dust.

In regard to chlorides, examinations in Scotland, Ireland and France show that their presence in the atmosphere is largely dependent upon the proximity of the rain-fall examined, to the sea. In Ireland, for example, a marked decrease is observed as the west shore is left, putting aside exceptional instances, in the vicinity of manufactories or large towns. Such chlorides are calculated and regarded as common salt, and are attributed to the conduction into the atmosphere of salty

particles, mainly from the ocean. It affords an interesting inquiry, from our maritime position, to determine to what extent our rain falls afford traces of this substance. In 1884, on Staten Island, thirty-two rain falls were examined for chlorine, and though 10 or 14 storms or rains were missed, these examinations yielded results which are instructive. The lowest results were obtained on July 12th and August 5th, which were respectively .056 grains and .062 grains of chlorine per gallon, or .092 grains and .102 grains of common salt per gallon. The highest results were obtained on June 26th and Oct. 3d, which were respectively .816 grains and .643 grains of chlorine per gallon, or 1.34 grains and 1.05 grains of common salt. The former of these last two determinations was made upon water collected in a severe easterly storm, the latter in a shower after a long drought. Easterly storms gave strong chlorine reactions as a rule, but not invariably, and even after previous rains the determinations were highest at the end of the rain spell, as on Aug. 9, when, .593 grains per gallon of common salt was obtained, though at the outset of the same wet spell only .102 grains per gallon were found. The averages for the different seasons were, in grains, per gallon:

Winter Chlorine...	.1456	or Common Salt...	.24
Spring " .....	.2137	" " " .....	.3523
Summer " .....	.2322	" " " .....	.366
Autumn " .....	.3693	" " " .....	.61

The highest averages belong to Spring and Autumn, as the Summer result was disproportionately increased by the phenomenal and perhaps doubtful result of June 26th. This gives an average for the year of chlorine, grains per gallon, .228 common salt .376, and taking an average rain fall of 3.5 inches leads to the interesting conclusion that, calculated as common salt, the chlorides of 1884 in our rain fall amounted to 5.10 lbs. per acre. It is also likely that free hydrochloric acid has frequently occurred in the water collected, and reactions for sulphates and sulphuric acid, doubtless emanating from the works across the Kills, have been obtained.

A specimen from the serpentine outcrop on the shore at New Brighton Point, known as "lightning rock," was presented. This outcrop was until lately of particular interest on account of the well marked glacial grooves upon its surface. Recent filling in by the Rapid Transit R. R. Co. have, however, completely hidden it from view.

Adjournment at 9.45 o'clock.

PROCEEDINGS
— OF THE —
Natural Science Association,
OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *April 11th*, 1885.

Meeting called to order at 8.30 P.M.

After the usual business was transacted Mr. W. T. Davis read a paper on the variations of *Mya Arenaria* on the shores of Staten Island. He called attention to the peculiarities of growth exhibited by the "soft clam" on various portions of the coast of Eastern North America, and also to its habits; after which the paper continued in substance as follows:—The variations exhibited by this *Mya* on the shores of our Island are not without interest, the cause of these variations being referable to the character of the beach on which the clam has grown.

Starting with the most easterly point, viz.: at New Brighton, where the shore is rocky, we find the clams only of moderate size, the ends often broken and the exterior corrugated. This type of shell extends to the mouth of the Narrows, ending at the fort. On the sandy beach beyond, which is open to the sea, the shells exhibit quite a different character, being very thin and of even growth as compared with those of the other localities. All the lateral and transverse markings are complete, the shells often being very beautiful in form and color and it is here that the largest specimens are to be found.

About $\frac{1}{2}$ mile past the "Elm tree light" the peat composed of the salt meadow vegetation forms a considerable portion of the beach reaching out to low water mark, and in some places no doubt to a considerable distance beyond. This kind of shore again brings a somewhat different type of shell. The peat appears to be a substance in which it is difficult for the *Mya* to burrow and the shells collected at this portion of the beach exhibit more deformities than those from any other. They are also often much rounded. Horticulturists in growing short plump vegetables, notably the sweet potato, have recourse to a so-called "hard pan" to bring about the desired results, and I have no doubt that the peat,

acting as a natural hard pan, thus alters the shape of our *Mya*.

All over the surface of the peat, when exposed at low water, are to be found small specimens of this clam, occupying the little pools, only a few inches deep. These small specimens are not so contorted as their larger brethren, probably owing to their youth and the fact that they have not grown too large to occupy the little holes left by the displacement of the swamp rush stems. The shells that occupy the peat seem to be in a particularly unfavorable situation for their safety. I have noticed the crows picking them and other inhabitants from their retreats, and all around the logs which lay high up on the beach may be seen the remains of these shells. Of these denizens of the peat, there is one that sometimes proves too much for the crow that has captured it. This is the ribbed mussel. I have found a number of these lying uninjured about the logs referred to. It may be that the crows do not like them, but I rather suspect that they have proved too difficult to open.

Between two of these outcrops of peat the sandy beach appears again, for a few hundred feet, and with it the type of *Mya* usually found thereon, showing how close the relation really is between the character of the beach and the shell occurring on it.

After passing Seguine's Point, the shore for the remainder of the way to Tottenville presents the same rocky character as that at New Brighton, and the shells can not as a consequence be distinguished from those coming from that locality.

The committee on public lectures announced that the next entertainment would be a microscopical exhibit, preceded by remarks by the president, Dr. A. L. Carroll, to take place on Saturday evening, April 25.

Adjournment at 9.45 o'clock.

PROCEEDINGS

— OF THE —

Natural Science Association, OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *May 9th, 1885.*

Meeting called to order at 8.30 o'clock.

Dr. N. L. Britton read a paper upon the relative progress of this and previous seasons, as indicated by the development of vegetation.

At the approach of every Spring we hear statements made to the effect that the season is very early or very backward, or much earlier or later than last year, and others of a similar character. There are several classes of phenomena which might be used as factors in the determination of this question; among these are the first appearance or mating of migratory birds; the first run of shad; the earliest peeping of frogs; the appearance of certain hibernating animals; and very profitably the tabulating and comparison of observed meteorological phenomena. I think that perhaps the evidence afforded by plants, which are governed less than animals by what we may term the accidental conditions of climate, and whose progress in leaf and flower development is of a steady and persistent character, is of a more satis-

factory nature than that contributed by the others mentioned. I have, therefore, prepared the following tabulated statement of observations on 16 trees and shrubs. It may be remarked that later in the season the difference in advance is not noticeable, as the favorable conditions for plant growth which then obtain cause a rapid development in even a very late season, and by the first of July at least, vegetation is found to be about the same year after year.

The three sets of observations were made on the same individual plants. A more complete list representing the relative condition of foliage and flower-buds of 65 species during 10 consecutive weeks in 1878, on Staten Island, may be found in the Bulletin of the Torrey Botanical Club, VI., 236. From a study of these notes, and from additional observations on other plants, the present Spring would seem to be in this locality about ten days later than that of last year, and nearly a month later than that of 1878:

PLANT	APRIL 14, 1878	APRIL 13, 1884.	APRIL 19, 1885.
SHAD BUSH	Well in flower	Buds $\frac{3}{4}$ in	Buds $\frac{1}{2}$ in.
WHITE WILLOW	Catkins $1\frac{1}{2}$ in.	Only starting	Not started
AMERICAN ELM	Flowers falling	In bloom	Buds unfolding
DOGWOOD	Buds $\frac{1}{2}$ in.	Not started	Not started
PEACH	In partial flower	Buds starting	Not started
SPICE BUSH	Full bloom	In partial flower	Only in bud
TRUMPET HONEYSUCKLE	Lvs. fully grown	Leaves 1 in.	Leaves $\frac{3}{4}$ in.
JAPAN QUINCE	Full bloom	Flower buds swelling	Buds unfolding
COMMON LILAC	Lvs. $1\frac{1}{2}$ in.	Buds $\frac{1}{2}$ in.	Buds $\frac{1}{4}$ in.
RED MAPLE	Fruit formed	In partial flower	Buds unfolding
CRAB APPLE	Lvs. starting	Buds $\frac{1}{4}$ in.	Buds starting
HORSE CHESTNUT	Lvs. starting	Buds $\frac{3}{4}$ in.	Buds $\frac{3}{4}$ in.
CHERRY	Buds opening	Buds swelling	Buds swelling
HIGH HUCKLEBERRY	In flower	Buds swelling	Buds swelling
WILD CHERRY	Lvs. 1 in.	Buds starting	Not started
LARCH	Lvs. $\frac{3}{4}$ in.	Not started	Not started

Mr Hollick followed with a few notes in regard to the Red shouldered Hawk, which is exceedingly abundant on the Island. Observations taken each year since 1873, show that they invariably begin nesting in the first or second week in April, without regard to the severity or mildness of the season. One pair that formerly built year after year just back of Clove Lake, occupied the same nest twice in one season, and when again disturbed

took to a deserted crow's nest about 150 feet away. The woods between Bull's Head and New Springville seem to be particularly favored, a nest being invariably located there each year, most probably by the same pair of birds. Another pair built for several successive years in a wood near Huguenot; but it was unfortunately known to some Brooklyn oölogists whose annual raids finally discouraged the birds.

Adjournment at 9.45 o'clock.

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Net

PROCEEDINGS

— OF THE —

Natural Science Association,

OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *June 13th, 1885.*

Meeting called to order at 8 30 o'clock.

Mr. Hollick elected president *pro tem.*

Mr. E. A. Congdon exhibited, under the microscope, specimens of *Hydra vulgaris*, from Silver Lake, also a series of slides illustrating the palates of certain Gastropods. The palate, or *odontophore* as it is called by Huxley, is placed in the lower part of the "food" and consists of a narrow ribbon $\frac{1}{20}$ of an inch in width and from $\frac{1}{4}$ to $\frac{1}{2}$ an inch in length, containing numerous rows of minute silicious teeth, which are very sharp and are generally pointed inwards. In the common garden snail (*Helix*) there are as many as 20,000 of these small teeth. Specimens of pond life and other matters of microscopical interest were also exhibited.

A specimen of *Crepidula fornicata*, commonly known as the boatshell, completely encased in a mass of Bryozoön. (*Escharina vulgaris*, *Leidy*) was presented. This coral like growth is often found encrusting stones and other objects along our shores. The specimen in question was collected on South Beach by Dr. N. L. Britton. A mounted section of the same was exhibited under the microscope, showing the cellular structure, each of the cells having been occupied by a polype during the life of the Bryozoön.

Mr. Hollick distributed copies of the third appendix to the "Flora of Richmond Co." with the following notes:

The original catalogue by Messrs. Britton & Hollick, published in 1879, contained 1,050 species. At the close of 1879 the first appendix was issued, enumerating 46 more. In 1882 the second appendix was published containing 67 additions. The third appendix, published since the last meeting, shows a further list of 46. This gives a total of 1,211 species of plants growing independent of cultivation on Staten Island, which has an area of only

about 59 square miles, while the entire flora of New York, covering an area of about 45,000 square miles, numbers only a few over 1,800 species. In other words little Richmond Co. is the possessor of $\frac{2}{3}$ of the state flora as known at the present time. About 45 of our species were new to the State when found and were desiderata to the State Herbarium. The "Flora of Westchester Co.," which covers an area five times as large as Richmond County, shows a list of 1,188 species—23 behind ours. For some rare plants and plants whose localities are now destroyed we are indebted to the herbariums of the late Dr. Samuel Elliot and Mr. Wm. H. Leggett. Some of the plants in the latter were collected almost twenty five years ago, in localities which are now occupied by cultivated ground, gardens, beer saloons or other evidences of civilization. All but about 125 species were personally collected and verified. In five instances the original determinations have been altered and two species have been dropped from the original catalogue, which were admitted without proper care. The surprising richness of the flora is due in a great degree to the geological formations. The Cretaceous sands and clays around Tottenville carry with them many of the New Jersey Pine Barren plants, while the Drift which covers the rest of the Island affords a home for most of the plants that occur for a considerable distance to the north of us. The physiographic conditions are also of importance, as we occupy a position surrounded by salt water and offering, in addition, every advantage of high and low ground, open fields and thick woods. A few species have also been introduced in ballast, which has been used for filling in docks along our shores.

Adjournment until the second Saturday in September.

Mich. 19/86

PROCEEDINGS
— OF THE —
Natural Science Association,
OF STATEN ISLAND.

Extra No. 3.

VILLAGE HALL, NEW BRIGHTON, August, 1885.

PRELIMINARY LIST OF THE MAMMALIA
OF STATEN ISLAND, BY W. T. DAVIS.

So few facts, in comparison to the great mass of those observed in any thickly settled locality, concerning the native animals and their habits, fall within the pale of one's own experience, that a preliminary paper giving the data collected by any single individual seems always in order. With this apology, I offer the few fragmentary notes I have collected in reference to the mammalian fauna of Staten Island.

About forty-five years ago, according to a Staten Island historian, foxes might be observed skulking along our hedge rows and walls, but none have been seen of recent years, and their extermination with that of the raccoon is no doubt complete.

It seems a little strange that the woodchuck does not occur on the Island, but such appears to be the case, for neither in my rambles nor upon inquiry have I been able to learn anything of it, and it becomes, therefore, an interesting question as to whether it has ever, or at least in comparatively recent years, existed within our limits. The red squirrel and opossum also live a few miles distant from our shores in New Jersey, but I have never heard of their being seen among the wooded hills of Staten Island.

Weasels appear to be seldom noticed on the Island by those in quest of natural lore, but one afternoon this last Spring, I was fortunate enough to observe a specimen of the "least weasel" climbing up a slightly inclined chestnut tree. It seemed under such circumstances to be a poor climber, and fell to the ground in a clumsy effort to seize a limb.

A number of marine mammals frequent the bay at times and the seal, (*Phoca con-*

color) is not an uncommon Winter visitant. Robins reef is named from the fact that they were once numerous there, *robin* or *robyn* being the name in Dutch for seal. At Prince's Bay there are several large boulders known as "seal rocks," from the circumstance of an occasional animal of this kind being seen on or about them.

At least two additional bats are to be found, and perhaps an extra mole and mouse may be added in time to the list:

CARNIVORA—

Putorius vulgaris, Cuvier. Least Weasel.

Putorius ermineus, Cuvier. Common Weasel.

Putorius vison, Gapper. Common Mink.

Mephitis mephitica, Shaw. Common Skunk.

CHIROPTERA—

Vespertilio subulatus, Say. Little Brown Bat.

Atalapha noveboracensis, Erxl. Red Bat.

INSECTIVORA—

Scalops aquaticus, L. Common Mole.

Condylura cristata, L. Star-nosed Mole.

Blarina brevicauda, Say. Mole Shrew.

RODENTIA—

Sciuropterus volucella, Pall. Flying Squirrel.

Sciurus carolinensis, Auct. Gray Squirrel.

Tamias striatus, L. Chipmunk.

Zapus hudsonius, Zim. Jumping Mouse.

One specimen taken near Richmond by Mr. Chas. Raymond.

Mus decumanus, Pallas. Norway Rat.

"*musculus*, L. Common House Mouse.

Hesperomys leucopus, Raf. Deer Mouse.

Arvicola riparius, Ord. Meadow Mouse.

Fiber zibethicus, L. Muskrat.

Lepus sylvaticus, Bachman. Gray Rabbit.

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PROCEEDINGS

— OF THE —

Natural Science Association, OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *September 12th*, 1885.

No quorum being present, an informal meeting only was held.

A large stone axe, obtained by purchase, was exhibited, and the following data in regard to the same were given: It was dug up in the neighborhood of the Billopp House, Tottenville, during the excavation of a cellar, and is said to have accompanied several other implements and a skeleton of large size. It is fashioned from a large, somewhat flattened pebble of brown quartzite. Only a small portion of the original surface remains, on each of its flat sides, all the rest having been pecked away. The surface is rough and the edge blunt. It is apparently as perfect as when first wrought, with the exception of two or three minute chips off the edge. The weight is 12 lbs. Extreme length, $10\frac{3}{4}$ in.; greatest width, $6\frac{1}{2}$ in.; greatest thickness, $3\frac{1}{2}$ in.; girth around groove, 15 in.; width of groove, $1\frac{1}{4}$ to $1\frac{1}{2}$ in.; depth of groove, $\frac{5}{16}$ in.; distance from centre of groove to cutting edge, $6\frac{1}{4}$ in.; distance from centre of groove to blunt end, $4\frac{1}{2}$ in.

The following miscellaneous memoranda, noted by members during the past Summer, were read and discussed: On June 21, a great crested flycatcher's nest, containing eggs, was found in a depression of the ground, amongst the roots in the hollow of an old tree. The bird later on paid the penalty of its unique nesting place by having its family destroyed by some prowling animal—only a few bones and feathers remaining to tell the tale.

During the last week in June, a chimney swallow's nest, containing eggs, was found attached to the side of an old well, about four feet from the top of the well or about six feet from the top of the box surrounding it. It adhered very loosely, which was due no doubt to the moisture

preventing the gelatine from becoming hard.

There had been some discussion regarding the habits of the Maryland yellow-throat. This bird oftentimes acts as if it had a nest in the vicinity of the observer, when in reality it has no nest at all, or if one, it may be at a very great distance. A number of observations were made this last Summer in reference to this fact, all tending to prove the above statement. The following note was made on July 19th: "To day I came across a Maryland yellow-throat in the woods, which made so much noise, that I threw several sticks at it in order to drive it away and restore quiet, so that I might inspect the insects on an elder blossom undisturbed. It did not leave however, and I, in despair, left for another place, walking at first fast and then slow, as I came to some sumach flowers. In a little while I heard the bird coming, scolding, as it hopped from bush to bush, until it finally reached a position near me and acted as before described. I moved off now, to see if it would follow, which it did, and I succeeded in drawing it several hundred feet from the place where it made its first attack."

Printed lists of the mammals of the Island were distributed, copies of which will be sent out with the current Proceedings.

The Corresponding Secretary read a letter from Mr. Chas. Peck, curator of the Herbarium, State Museum, acknowledging the receipt of the 3rd appendix to the Flora of Richmond Co., in which he enumerated 29 desiderata to the State Herbarium.

Erratum.—In Proceedings for June 13, 1885, for *Escharina vulgaris*, Leidy, read *Escharina variabilis*, Leidy.

PROCEEDINGS

— OF THE —

Natural Science Association, OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *October 10th, 1885.*

Meeting called to order at 8.30 o'clock.

In the absence of the President, Dr. N. L. Britton was elected chairman *pro tem*.

Mr. Hollick showed plants of the Part-ridge Berry, (*Mitchella repens*, L.) bearing peculiar leafy berries, and made the following remarks upon the same:

"Last Autumn I mentioned finding some of these berries at Tottenville, with green leaves apparently growing out of the top or sides. On first sight these leaves appear like developments of the calyx lobes, but on a close inspection it is seen that the green leaves are growing from expanded petioles, which have tightly clasped the berries, to a greater or less extent, and assumed their red color. The line between the berry and its enclosing envelope is not always distinct, but during the Winter specimens which had been frozen were examined, and in them the line could be traced far more distinctly, owing to the berry being somewhat shrunken. These berries were kept in water for some time, and although they and the stem leaves retained their colors perfectly, yet the adventitious leaves soon turned yellow and withered away. During the past Summer and present Autumn the locality was again searched for fresh specimens, and a number were discovered. In the newly developed berries, as might be expected, the clasping petioles had not yet assumed the pure red color, many being of a duller red and some distinctly streaked with green. After having been kept in water for a few days, however, the red became uniform throughout."

Mr Congdon exhibited a spider covered with a fungoid growth, a species of the genus *Achlya*, and gave an account of its life history. This fungus is frequently found on insects which have fallen into the water, as in the case of this spider. It begins as a microscopic germ. A small thread next grows out from one side, bifurcating as it extends, until by repeated subdivisions it has formed a complete net-

work of delicate threads. It reproduces itself asexually by means of the protoplasm in these threads which breaks up into little balls, and when ripe is expelled into the water. They swim about for some time by means of ciliæ placed at either end, which finally settle down on the body of the nidus, and in a short time have grown into a plant like the parent.

Mr. W. T. Davis exhibited a deformed specimen of *Danaïs Archippus*, the Monarch Butterfly. On the 6th day of August, a full grown caterpillar was collected, and, after having transformed to a chrysalis, was removed from its point of suspension and a pin passed through it. This chrysalis was intended for a cabinet specimen, but it was noted as time went on that it gradually changed color, assuming the tints peculiar to the chrysalis before the butterfly emerges.

On the 21st of August the butterfly hatched out; having developed about the pin. This pin passes through the body at or near the second abdominal segment, being very close to the ventral surface. It would be interesting to know whether the passing of the pin through the chrysalis caused the insect to develop, as it did, almost entirely on one side of it, or whether the pin bore the same relative position to the various parts of the developing butterfly as it does to the imago.

Dr. Britton offered a few remarks on a specimen of Labradorite, a portion of a large boulder discovered in the drift at the base of Richmond Hill. A small specimen of this was collected some time ago on Staten Island, and its re-discovery in the locality mentioned is of considerable geological interest and value. It occurs very sparingly in the glacial drift of New Jersey, only a few specimens having been obtained up to date. Along the Hudson River it has been found in several places, chiefly near Peekskill. The Canadian Highlands and Adirondacks are the only localities to the north of us where outcrops of this rock are known, hence our specimens must have been transported across this entire drift area and dropped to form part of the great terminal moraine on Staten Island.

Adjournment at 9.45 o'clock.

PROCEEDINGS
— OF THE —
Natural Science Association,
OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, November 14th, 1885.

Meeting called to order at 8.30 o'clock.

Dr. Britton elected chairman *pro tem*.

Reports of officers for the past year were read and accepted.

The election of officers for the coming year was held, with the following result: President, Dr. A. L. Carroll; Treasurer, Samuel Henshaw; Recording Secretary, Ernest A. Congdon; Corresponding Secretary, Arthur Hollick; Curator, William T. Davis.

Mr. Congdon described a species of crustacean, new to the fauna of North America, belonging to the genus *Cyclops*. Specimens of it were found in ponds in the vicinity of Silver Lake, and were determined to be a species previously found only in Germany, viz.: *C. insignis*, Brady. To preclude any possibility of error, a number of specimens in alcohol were sent to Prof. C. L. Herrick, of Minneapolis, the authority on microscopic crustacea in this country, who said they were indeed the foreign species and that a new form was thus added to the crustacean fauna of North America. The following is a technical description of the species:

Cyclops Lubbockii, Brady = *Cyclops insignis*, Brady. Length of body, including setae, 4 mm. Antennae 14-jointed. First foot, outer ramus, has three external spines on the distal segment, two setae at the end and three within; inner ramus has one internal seta, a spine and a seta terminally, and three external setae on the

distal segment. The outer terminal segment of the fourth foot is like the first; the inner one has only two external setae. The external setae of the caudal stylets exceed half the length of the stylet and are pectinate. The fifth foot has a short basal joint armed with a single seta, the second joint being slender and armed with two unequal setae. Habitat—North of Germany—(Brady, Claus, Herrick.) Richmond County, New York—(E. A. Congdon.)

Dr. Britton called attention to a fine specimen of Schoharie Grit, composed entirely of the remains of *Spirifer arrectus*. It was obtained from the drift material now being excavated at the site of the Vanderbilt Mausoleum, New Dorp.

In the preface to the Preliminary list of the Mammals of Staten Island, printed last August, it was stated that two additional bats ought to be found here, and these have lately been secured. Mr. Chas. Raymond exhibited a specimen of the Silver black bat, (*Vespertilio noctivagans*) collected by himself, and also one of the Hoary bat (*Atalapha cinereus*), shot by Mr. S. Ogleby. The latter species is rather rare, but it would appear to have visited this locality in some numbers during the present Autumn, as one was also shot in the latter part of October near New Lots, Long Island.

Adjournment at 9.45 o'clock.

Proceedings of the Natural Science Association OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *December 12th, 1885.*

Meeting called to order at 8.15 o'clock.
Mr. Sanderson Smith elected chairman
pro tem

Messrs N. L. Britton, E. A. Congdon
and L. P. Gratacap were appointed the
committee on public lectures for the com-
ing season.

A list of the birds known to breed on
Staten Island was presented, printed
copies of which will be sent out with the
Proceedings.

Mr. Hollick stated that an important
find of fossil vegetable remains was dis-
covered in the Kreischerville fire clay on
Nov. 15; but that it was deemed best to
merely place the fact upon record, and to
leave the full account of the same until
the material collected had been studied
more carefully.

Mr. Gratacap presented notes upon the
composition of our beach sands, as
follows:

The beaches of sand which form the
margins of continents are the indices of
their decay and change. The slow dis-
integrating action of frost and water are
casting down from the adjoining land
fragments of rock, which exposed to the
mechanical and chemical action of oceanic
or fluvial waters become reduced and
pulverized, until only the more refractory
elements of the original masses are left as
worn and rounded grains. The material
of beaches too, indicate the rocky contents
or structure of the lands they surround,
but in all instances, experiments have
proven, a solvent action goes on in
the rolling and grinding of the
pebbles and grains, and the hornblendes,
feldspars and even the silica is taken into
solution, so that while the rocks of a sea-
coast may be represented on its beaches,
the relative proportions of their various
constituents may be quite reversed, as the
soluble parts disappear, leaving only the
most durable and resistant portions. Over
our Island is deposited an extensive and
thick mantle of detrital material which is
packed in varying proportions with stony
fragments representing the scourings of
the county north and west of us, embrac-
ing trap, sandstone, hornblende schists,
granite rocks, slates, quartzites, breccias,
limestones, grits and serpentine. The
washings from the morainal bluffs and
hills of great quantities of their stony con-
tents, both in recent and in past periods,
has contributed largely to the formation
of our present sands around the Island.
An examination of these sands, regarding
them mainly as the residuum from the
reduced and denuded glacial heaps, is of
interest.

Three samples of earth taken from un-
disturbed lawn ground, from the Terrace,

near West New Brighton, North Shore,
and from the barren morainal hills south
of Grimes' Hill, respectively yielded 20
per cent., 30.8 per cent., 78.4 per cent. of
stony fragments and sand. The larger
pebbles—granite, trap, sandstone, serpen-
tine—are mingled with a great quantity
of quartz, blue and red-sandstone grains,
as sand. These grains have been ex-
posed to water wearing before they were
gathered up in the morainal barrow,
while many of them are angular, unmodi-
fied by the friction of water rolling, and
have been ground in their motion south-
ward. Now, if the beach sands have
been derived from the sifted and washed
soils and glacial drift of the Island, the
disappearance of these red-sandstone and
slate granules is striking, especially in the
beach sands examined from the South
Beach, east of New Dorp. Where the
beach sand is constantly supplied by the
proximity of the detrital mounds and
terraces to the beach, the red-sandstone
and slaty particles are more numerous,
giving a pepper and salt, and red appear-
ance to the beach. This is seen at Prince's
Bay and on the North Shore at New
Brighton and Snug Harbor; but in the beach
sand examined from east of New Dorp,
the quartz grains largely predominate.
They are mostly pellucid particles derived
from granite rocks, corroded and rounded,
infrequently angular, mingled with opaque
quartzite spheres resembling the pebbles
in the breccia and gravel drift on the
Island, and give a general white appear-
ance to the beach. Granite fragments in
larger pebbles are found (rare) amongst
the coarser parts of the sand with sepa-
rated feldspar pieces, and rarely mica
scales, but these disappear in the finer por-
tions. The general result, which is pre-
liminary to a closer examination of our
beach sands, and those of New Jersey and
Long Island, is that the mechanical and
solvent action of the sea water is slowly
gathering to itself the soluble mineral
elements of the stony matter contributed
from the land, leaving the refractory
quartzose granules to compose the sand.
The crushed sandstone particles seem to
form the *dust sand*, both along our beaches
and in the morainal drift, while grains
of trap rock are infrequent in both
deposits.

Mr. James Raymond presented a nest
of the Acadian flycatcher, composed
entirely of dried chestnut catkins, mak-
ing necessary an addition to the list of
birds known to nest here. Mr. Raymond
also exhibited a specimen of *Zapus hudson-
sonias*, the jumping mouse, being the only
specimen thus far known to have been
captured on the Island.

Adjournment at 9.45 o'clock.

PROCEEDINGS

— OF THE —

Natural Science Association, OF STATEN ISLAND.

Extra No. 4.

VILLAGE HALL, NEW BRIGHTON, December, 1885.

PRELIMINARY LIST OF THE BIRDS KNOWN TO BREED ON STATEN ISLAND.

The following list of 67 species represents that part of our bird fauna which is known to have nested here within the past fifteen years. Several species not in the list would no doubt have been included had it been compiled a quarter of a century ago, and there is also a strong probability that some eight or ten others may yet be added by a careful search. The value of the present list will, however, be appreciated by all who have seen the gradual disappearance of some of our species, and the scarcity of others which were formerly abundant. I am indebted to my fellow members, Messrs. Wm. T. Davis, C. and J. Raymond, L. M. Sawyer, H. A. Wheeler and G. J. Hicks, for memoranda which have helped to make the list what it is.

ARTHUR HOLLICK.

<i>Turdus migratorius.</i>	Robin.
" <i>mustelinus.</i>	Wood Thrush.
<i>Harporhynchus rufus.</i>	Brown Thrush.
<i>Mimus polyglottus.</i>	Mocking Bird.
" <i>carolinensis.</i>	Cat Bird.
<i>Sialia sialis.</i>	Blue Bird.
<i>Lophophanes bicolor.</i>	Tufted Titmouse.
<i>Parus atricapillus.</i>	Chickadee.
<i>Troglodytes ædon.</i>	House Wren.
<i>Telmatorhynchus palustris.</i>	Long-billed Marsh Wren.
<i>Cistothorus stellaris.</i>	Short-billed Marsh Wren.
<i>Dendroica aestiva.</i>	Summer Yellow Bird.
<i>Seiurus aurocapillus.</i>	Oven Bird.
<i>Geothlypis trichas.</i>	Maryland Yellow-throat.
<i>Icteria virens.</i>	Yellow-breasted Chat.
<i>Pyranga rubra.</i>	Scarlet Tanager.
<i>Hirundo horreorum.</i>	Barn Swallow.
<i>Tachycineta bicolor.</i>	White-bellied Swallow.

<i>Petrochelidon lunifrons.</i>	Eave Swallow.
<i>Ampelis cedrorum.</i>	Cedar Bird, or Wax-wing.
<i>Vireo olivaceus.</i>	Red-eyed Hang Bird.
" <i>noveboracensis.</i>	White-eyed Hang Bird.
<i>Chrysomitris tristis.</i>	Yellow Bird.
<i>Ammodromus maritimus.</i>	Sca-side Finch.
" <i>caudacutus.</i>	Sharp-tailed Finch.
<i>Melospiza palustris.</i>	Swamp Sparrow.
" <i>melodia.</i>	Song Sparrow.
<i>Spizella socialis.</i>	Chippy.
" <i>pusilla.</i>	Field Sparrow.
<i>Passer domesticus.</i>	English Sparrow.
<i>Cyanospiza cyanea.</i>	Indigo Bird.
<i>Cardinalis virginianus.</i>	Cardinal Grosbeak.
<i>Pipilo erythrophthalmus.</i>	Chewink.
<i>Dolichonyx oryzivorus.</i>	Bob'o-link.
<i>Molothrus pecoris.</i>	Cow Bird.
<i>Agelaius phoeniceus.</i>	Red-winged Blackbird.
<i>Sturnella magna.</i>	Meadow Lark.
<i>Icterus spurius.</i>	Orchard Oriole.
" <i>baltimore.</i>	Baltimore Oriole.
<i>Quiscalus purpureus.</i>	Crow Blackbird.
<i>Corvus americanus.</i>	Common Crow.
" <i>ossifragus.</i>	Fish Crow.
<i>Cyanurus cristatus.</i>	Blue Jay.
<i>Tyrannus carolinensis.</i>	King Bird.
<i>Myiarchus crinitus.</i>	Great-crested Flycatcher.
<i>Sayornis fuscus.</i>	Phoebe Bird.
" <i>virens.</i>	Peewee.
<i>Empidonax minimus.</i>	Least Flycatcher.
<i>Chordeiles virginianus.</i>	Night Hawk.
<i>Chaetura pelagica.</i>	Chimney Swallow.
<i>Trochilus colubris.</i>	Ruby-throated Hummingbird.
<i>Ceryle alcyon.</i>	Belted Kingfisher.
<i>Coccyzus erythrophthalmus.</i>	Black-billed Cuckoo.
" <i>americanus.</i>	Yellow-billed Cuckoo.
<i>Picus pubescens.</i>	Downy Woodpecker.
<i>Melanerpes erythrocephalus.</i>	Red headed Woodpecker
	[pecker, or Highholder.
<i>Colaptes auratus.</i>	Golden-winged Wood-
<i>Scops asio.</i>	Screech Owl.
<i>Accipiter fuscus.</i>	Sharp-shinned, or Pigeon
	Hawk.
<i>Buteo lineatus.</i>	Red-shouldered Hawk.
<i>Pandion haliaetus.</i>	Fish Hawk, or Osprey.
<i>Ectopistes migratorius.</i>	Wild Pigeon.
<i>Ortyx virginianus.</i>	Quail.
<i>Philohela minor.</i>	Woodcock.
<i>Tringoides macularius.</i>	Treater-tail, or Peep.
<i>Ardea virescens.</i>	Shytopoke.
<i>Rallus longirostris.</i>	Clapper Rail, or Mud Hen.

PROCEEDINGS

— OF THE —

Natural Science Association,

OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *January 9th, 1886.*

A quorum not being present, an informal meeting only was held.

Mr. Wm. T. Davis offered the following remarks on the habits of some of our native squirrels and mice:

In the most recent books wherein our Eastern North American squirrels and their habits are described, I have looked in vain for any general statement regarding the fall or mid-summer brood of young. I have made a few observations on the subject, the substance of which I have not found noted, and for this reason I have brought the facts before you, thinking they might be of general interest. In a list of mammals the Flying Squirrel is usually placed before the rest of its kin, so in these remarks I will also consider it first. Mr. Abbott, in his "Naturalist's Rambles about Home," merely states that this squirrel builds large nests of leaves high up in the tallest trees, which are in every particular the same as the leaf-nests of the common Gray Squirrel. In Dr. Merriam's "Vertebrates of the Adirondack Region," however, there is considerable information given. He says: "Flying Squirrels make their nests in the hollows of trees, frequently taking possession of deserted woodpeckers' holes. They are easily aroused and driven out by hammering against the trunk. I have thus expelled the occupants of as many as half a dozen nests in a single day's hunt. Their progeny must be brought forth early in April, for on the 30th of April, 1878, Dr. C. L. Baggs and myself took three half-grown young from a woodpecker's hole, about fifteen feet above the ground, in a decayed stub." In describing a variety known as the "Northern Flying Squirrel," he says: "They breed about a month latter than their smaller relative. June 18th, 1883,

Dr. A. K. Fisher and the writer found the nest of a Northern Flying Squirrel at West Pond, near Big Moose Lake. * * On cutting down the tree the nest was found to contain three nursing young, not yet one-third grown; they were estimated to be about a month old."

In all probability the squirrel in question does not have a fall brood in the Adirondack region, but as Dr. Merriam quotes largely regarding the habits of this and other mammals, it seems hardly likely that he should have left any important fact unnoticed.

On August 9th. of this past Summer, Mr. Hollick and myself were rambling about the woods near Four Corners, when he remembered a curiosity in the vicinity, consisting of two small elms, which crossed trunks about fifteen feet from the ground, and the constant wearing of the bark as they swayed in the wind caused them to decay, and a hollow had gradually been formed. In this cavity we found a female Flying Squirrel, which we caught in an insect net and also six very small young.

Again on September 11th, while in Sussex Co., N. J., I climbed up one of the mountains of the Barrier Range, tapping all the hollow trees that I met with for the squirrels which I expected to find. I was not disappointed, for out of a hollow sassafras there came a Flying Squirrel, and upon removing the decayed top I found a young one evidently very recently born. The nest in this case consisted of the usual dry grass and also of some freshly plucked leaves from an adjoining chestnut oak. These leaves were still green and fresh, and had evidently been recently gathered.

Next in the list of squirrels comes the

Red or "Chickaree." It is rather curious that this animal does not occur on Staten Island, as it seems able to take as good care of itself as does the common Gray Squirrel. Dr. Merriam writes concerning the breeding habits of this squirrel that "The young are generally born about the first of April, four to six constituting an average litter." While in New Jersey, on Sept. 2nd, I frightened one of these squirrels from a dead tree by hammering on the trunk, which after some effort I succeeded in pushing over. I found the usual amount of grass and in its midst four young.

The earliest date that I have seen a Chipmunk abroad on Staten Island, was on the 22nd of February, 1882, and the latest was on Thanksgiving day of last year. Mr. Abbott writes "that on May 29," he opened one of the nests of a family of Chipmunks in his garden, which contained five young, about three days old. Dr. Merriam says that "The season of Spring is occupied with the duties of rearing the young, which before June, are old enough to leave the nest." In August, 1877, while in Sullivan County, N. Y., I captured several of these little squirrels in a rat trap, baited with apples. Two of these I placed in a cage, made for the occasion, and in this cage on the 5th of the month two young were born. So it is evident that this squirrel also, has a mid-summer or fall brood of young.

The only squirrel that occurs in this vicinity which I have not mentioned is the gray, and of this I find a note in Dr. Merriam's writings to the effect that to the "South and west of the Adirondacks the Gray Squirrel commonly has two litters in a season, the second usually being born in September or October.

There is one other mammal that I wish to say something of, and that is the White-footed or Deer Mouse; the one that puts roofs on deserted birds nests and uses them for a habitation, though it also constructs little nests of its own out of cedar bark, and sometimes in preference to either of these makes its domicile in a hollow

log. We are not apt to think, when we look into a nest at the dark green eggs of a cat bird, what the future history of that nest may be, though we may form a more or less pleasing picture of the time when the young birds will fly away, and maybe return to the same woods the following Spring. However, when the birds are gone, it is two to one that the nest, if in a bramble, will be roofed over by a mouse and used as its abode. And when the mouse has deserted it a bumble bee may take possession, make its comb and rear its young, so that birds, mice and bees often follow one another in regular succession.

The method which this mouse pursues in gnawing hickory nuts is interesting. It usually commences near one end, as do the squirrels, but instead of eating the whole extremity off as they do, it generally makes two and sometimes three or four holes. In several of the nuts which I have given my captive specimens, the kernels were never developed or had become dried up, and on such occasions after discovering the fact at the first point of gnawing, they have abandoned the spot and gnawed at other places to ascertain probably, if it continued so throughout, before finally discarding it. One such hickory nut has four tiny holes in it; and another six.

What I wish to particularly record is a habit which I have never seen mentioned, a way I think which they have of communicating to one another, especially when surprised. This is accomplished by beating one of the fore paws very rapidly on the floor of the cage, or the limb of a tree, producing a noise somewhat similar to the tearing of a small piece of paper. This is done as I have said, when they are surprised, though I have occasionally heard it at other times.

Live specimens were here produced and after their bedding was removed, and they were otherwise disturbed, they acted in the manner described above, producing the sound with their fore paws many times.



F. F. C. del. 1886.

1. *Navicula Meniscus*, Shaw.
2. *Stellhanobrycon diaphanus*, Ehr.
3. *Melanocephalus ellipticus*, Grun.
4. *Pinnularia viridis*, Ehr.
5. *Melosira varians*, Agardh.
6. *Grammatophora serpentina*, Ehr.
7. *Navicula lanceolata*, Kütz.
8. *Melosira distans*, Kütz.
9. *Navicula affinis*, Ehr.
10. *Navicula pusilla*, W. Smith.
11. *Gombosonea gemmatum*, Agd.
12. *Gombosonea* - sp. n. (?)
13. *Sierrella ovata*, Kütz.
14. *Navicula gracilis*, Ehr.
15. *Stauroneis phoenicenteron*, Ehr.
16. *Epithemia purgida*, Ehr.
17. *Spongia bacula*.
18. *Diatoma vulgare*, Bary.
19. *Biblarium thomatus*, Ehr.
20. *Denticula elegans*, Kütz.
21. *Cocconeum lanceolata*, Ehr.
22. *Sierrella splendida*, Ehr.
23. *Uctinopylechus annulatus*, Grun.

PROCEEDINGS

— OF THE —

Natural Science Association, OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *February 13th, 1886.*

Meeting called to order at 8.20 o'clock.

Mr. Hollick exhibited specimens of fossil leaves, &c., from Kreischerville and New Jersey, with the following remarks upon the same:

At the December meeting mention was made of a find of vegetable remains, in the cretaceous fire clay beds at Kreischer ville, on Nov. 15th. The specimens collected at that time have since been carefully studied and compared with others from New Jersey, with the result of confirming what was, of course, to be expected, that our Kreischerville beds are but the extension of those at Woodbridge and Amboy, and were continuous with them until cut through in comparatively recent times by the channel of the Kills.

Our specimens are so fragmentary that it is doubtful if they would be of much value in identifying species, or even genera, did we not have the beautiful specimens from New Jersey to compare them with. This, however, I have been able to do, through the kindness of Professor Newberry, of the School of Mines, to whom I am also indebted for the specimens from New Jersey which I am able to show to night. All of our specimens were found in a narrow stratum, nowhere more than a foot in thickness, near the surface of the bed. The stratum was conspicuous from its dark color, due to the mass of lignified vegetable matter which it contained. Much of this was broken twigs and branches, some pieces being quite large and showing the woody texture very beautifully; they, however, fell in pieces upon exposure to the air. Willows must have been exceedingly abundant at the time this was deposited, specimens of this genus being found in almost every block of clay examined. There are two highly characteristic and distinct species, one with a broad lanceolate outline, tapering to a somewhat acutish tip, and the other a long narrow species, of almost uniform width, terminating in a blunt tip. There are great numbers of small leaves, evidently belonging to shrubs, resembling very closely some of our *ericaceæ*, and one of the fruits discovered appears to be very much like a *Vaccinium*. Pine

needles are distributed plentifully throughout, and in one specimen there is a sheath or bundle, containing *three* needles. Whether this was the normal number or not we of course cannot say, but it determines one point, namely: that the species was characterized by at least three needles in a sheath—possibly more, but not less. Another conifer which has left its marks is so close to *Sequoia* that it has been referred to that genus. There are also a number of fragments of parallel veined leaves, which are probably grasses or sedges. There are also little masses of a yellow substance here and there which I take to be a fossil gum or amber. This could, however, only be determined by chemical analysis. Fruits and seeds should be sought carefully, as they are generally quite satisfactory to determine, being less liable to destruction than the leaves.

Dr. Carroll called attention to the relation between the death rate for various diseases and the seasons. The variations in the rate were depicted graphically by means of waving lines—the figures being taken from the State Board of Health summary for the year 1885. The importance of the ground water as a factor in malarial diseases was urged, and the necessity of lowering its level by suitable drainage wherever possible. The speaker considered soil saturation as the principle source of malarial troubles on our Island, especially on the drift formation.

Mr. Wright exhibited a large mass of small stones, attached to one another by the edible mussel, (*Mytilus edulis*). The specimen was particularly interesting from the great number of these stones, perhaps a hundred in all.

Mr. Davis stated that he had been informed some time ago by Mr. Matthew Taylor, that a colony of Night Herons nested on Staten Island. The speaker in person had visited the heronry, and from information gathered, it appeared that the birds came to the locality about a dozen years ago, but as they have been persecuted by the Italian laborers, who eat their eggs in large numbers, it is doubtful if they will again return, only a few individuals having been seen this past Summer. Some of the farmers in the neighborhood also collected their eggs, which, when beaten up, were fed to the cows. The nests are exceedingly numerous and are built in a thickly wooded oak swamp.

Adjourned at 9.45 o'clock.



PROCEEDINGS
— OF THE —
Natural Science Association,
OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *April 10th, 1886.*

Meeting called to order at 8 30 o'clock.

The Corresponding Secretary read communications from the American Ornithologist's Union and Audubon Society, thanking the Association for its action in regard to the protection of American birds. Circulars of information from the above society and also blank pledges were distributed to the members. On motion of Dr. N. L. Britton, it was

Resolved, That the Corresponding Secretary be appointed a committee of one to take action on behalf of the Association at his discretion, in order to bring the subject before the public in the most effective manner.

Dr. N. L. Britton then read the following paper upon the drift at the South end of the Rapid Transit Railway tunnel at Tompkinsville:

The construction of the deep cutting and tunnel for the Staten Island Rapid Transit Railway, at Tompkinsville, has exposed a most interesting section through the Glacial Drift. This is seen to be truly morainal in its upper portion, consisting of large angular boulders and pebbles irregularly embedded in unassorted clay and sand. The lower part of the bank is, however, beautifully stratified and the materials composing it are sorted into bands and layers of different substances, strata of sand of several degrees of coarseness, others of clay, and still others of pebbles; very few boulders occur in this lower part, and these are in special well-marked bands and are more rounded than

those above.

While this exposure is of great interest as illustrating the difference between morainal and stratified drift at a glance, it is of much greater importance as furnishing an accurate measure of the depression of the coast at this point during the Glacial Epoch; for the altitude of the upper line of stratification above tide gives us the comparative position of the coast as regards its position in Glacial times. This is between 25 and 30 feet. Hence we may safely conclude that during the presence of the great ice sheet the shores of New York Harbor stood that amount lower.

As is well known, the coast is at present suffering depression. How much higher it has been since the retreat of the glaciers, or to how many oscillations it has been subjected since that time, are fair subjects for speculation, but cannot now be satisfactorily answered. I have observed the stratification of the drift at other places in the vicinity, but nowhere have I seen such a beautiful exhibition of it as here.

The independent studies of Mr F. J. H. Merrill on the Terraces of the vicinity, a preliminary account of which may be found in the annual report of the State Geologist of New Jersey for 1885, indicate about the same amount of depression in glacial times, and other observations of Professor Cook agree well with both. Professor Cook placed it at a maximum of 30 feet. As we go up the Hudson River we find the terraces and stratified drift rapidly reaching greater heights. The beautiful terrace at the mouth of Annsville Cove, Peekskill, on which the State Camp is located stands 80 feet above the river. The plain at West Point is about 125 feet high.

Adjourned at 9.45 o'clock.

PROCEEDINGS

— OF THE —

Natural Science Association, OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *June 12th, 1886.*

Informal meeting only—no quorum for the transaction of business being present.

The following notes upon the Mollusca of the Island, by Sanderson Smith, were read, and a list of the species thus far found here was presented. The list will be published separately.

The previous catalogue of the Mollusca of Staten Island, prepared by the late Dr. J. W. Hubbard of Tottenville and myself, and printed in the Annals of the New York Lyceum of Natural History in May 1865, contained 115 species and varieties, including one species of Physa and one of Succinea unnamed. The present list contains the same number.

The unnamed Succinea and Physa have been omitted, as well as Petricola dactylus, which is hardly worthy of being considered even a variety of *P. pholadiformis*. Against these three losses stand three actual additions. *Littorina irrorata* Planorbis trivolis, and *Pholas costata*. Besides these three additions, three species, *Teredo dilatata*, *Solen ensis* and *Anomia ephippium* have disappeared from the list, as probably erroneous identifications, being represented by *Teredo navalis*, *Ensatella Americana* and *Anomia glabra*. These three additions, three losses, and three changes of identification, represent all the real alteration in the list. But if the nomenclature alone is regarded, it will be found that, out of the 109 species and varieties remaining, only 53 still retain the names applied to them in 1865; and of the 56 changes, 46 are of the genus only, 3 of the species only, and 7 of both genus and species. These extensive changes are due partly to the great activity which has of late years been directed towards the distinction and characterization of differences which had previously been either unnoticed or not considered of generic importance, and partly to the enforcement of the laws of priority in nomenclature, and the reduction of many names to the rank of synonyms. Many of these names had been proposed before 1865 though not generally accepted; but on the whole, these numbers, 56 new against 53 old names, pretty fairly represent the amount of practical change in the last 21 years. To those who may feel alarm at the difficulties added to the study of Natural History by these extensive changes of nomenclature, it may be suggested that of the causes given for

them, the discovery of old and forgotten names, may be considered as exhausted; the reduction of species to synonyms, tends to diminish the stock of names to be ordinarily borne in mind, whilst the creation of well considered genera, gives much more aid in helping us to appreciate the mutual relations of different forms than is equivalent to the inconvenience caused by unaccustomed and often more cumbersome names. So great, too, has been the amount of labor expended of late years upon improved classification and generic subdivision, that that work may be considered as in a great measure accomplished for a considerable time to come, leaving to naturalists, as their principal duty, the adjustment of newly discovered species or new observations, to the framework already prepared for them.

I have indicated in the new list by a * prefixed to those species which have not been found abundantly on the Island, without marking any of the common ones. Rarity, in most cases, is probably only the result of imperfect investigation. One or two notes, however, may be useful. *Pecten irradians* appears to be still extraordinarily scarce on Staten Island, and *Laevicardium Mortoni* is still a doubtful inhabitant, whilst both of these species are common both to the South and to the East of us. The short variety, "*Similis*" of *Spisula solidissima*, is exceedingly abundant on Staten Island, south of Fort Tompkins, whilst on Coney Island, just opposite, I am not sure that I have ever found it. Only one or two specimens each of *Stenotrema hirsuta*, *Zonites suppressus*, *Pupa rupicola* and *Tebennophorus Carolinensis* have yet been found, while *Zonites fulvus* is still very scarce. *Patula striatella* and *Strobila labyrinthica*, though almost confined, as far as known, to one locality each, are very abundant there. The southern part of Staten Island is very much richer in land shells than the northern.

Mr. Hollick shewed monstrosities in the fruit of *Carya tomentosa*—some having twins and some triplets in the same husk. The twins were generally perfectly joined, but the triplets were separate, with the sides flattened where they pressed against each other, similar to chestnuts in a burr. All the nuts from the same tree were more or less affected.

The next regular meeting to be held in September.

PROCEEDINGS
— OF THE —
Natural Science Association,
OF STATEN ISLAND.

Extra No. 5.

VILLAGE HALL, NEW BRIGHTON, *July* 1886.

MEMORANDUM IN REGARD TO BIRD DESTRUCTION.

At the regular meeting of the Association, held March 13th, 1886, the following resolutions were unanimously adopted:

Resolved, that the Natural Science Association of Staten Island heartily sympathizes with the efforts now being made to protect the birds of the United States from destruction, and offers its earnest co-operation with any organization or individual having the desired object in view, and,

Resolved, That the Corresponding Secretary be and is hereby instructed to communicate with the committee on bird protection of the American Ornithologists' Union, in order to obtain information in regard to the subject, as a basis for further action.

In accordance with the above resolutions communication was opened with the American Ornithologists' Union, and this subsequently led to communication with the Audubon Society. Through the medium of the above organizations circulars of information and blank pledges for signatures were obtained, besides letters of encouragement, urging the prosecution of the work in this county. This correspondence was read and part of the circulars and pledges distributed at the meeting of the Association held April 10, 1886, when the results were considered to be so encouraging that the following resolution was unanimously adopted:

Resolved, That the Corresponding Secretary be appointed a committee of one to take action on behalf of the Association, at his discretion, in order to bring the subject before the public in an effective manner.

As a beginning, in order to carry out, if possible, the spirit of the above resolution, personal letters were sent to a few prominent citizens who it was hoped might be interested in the subject. The answers were in general very encouraging, as the following will show:

WEST NEW BRIGHTON.

STATEN ISLAND, N. Y., May 3d, 1886.

MY DEAR SIR:—I am very glad to hear that your Association, which has been already of great benefit to the Island, will join the crusade for the rescue of the birds from the hand of the spoiler. If any community should be resolved to protect the birds it is a rural neighborhood like ours, which the birds fill with constant music and cheer. To kill our bright and melodious little citizens of the air and trees in order to wear their dead bodies for ornament is an act worthy of barbarians. But it will not be encouraged by American women when they once consider its cruelty, and the carelessness of life which it produces among idle boys. I am sure that this community will gladly support your good work.

Very truly yours,

GEORGE WILLIAM CURTIS.

Ignorance of the subject on the part of many, total depravity or cruelty by others, and apathy in regard to the entire matter by the public in general, are undoubtedly the causes that have contributed to the lamentable results which every lover of bird-life has regretted and waxed indignant over for years past. That the ladies of our own community need educating and enlightening is apparent enough when anyone interested in the subject cares to observe and note the large number of birds or parts of birds that they use for personal ornamentation, especially on hats. During the present season several have attracted particular attention by reason of their display of victims. One for instance being composed entirely

of a pavement of swamp sparrow's heads, some thirty birds having been sacrificed for this one article of head gear. Another shows a mass of dismembered terns, the different parts representing together at least ten birds. A bunch of sandpipers, perhaps half a dozen in number, "ornaments" a third. Swallows have lately become a fashion, and several hats may now be seen in which these are the distinguishing features. Besides the indirect cruelty for which our women are so thoughtlessly responsible, there has been and is now an immense amount of wanton destruction and slaughter by depraved men and boys, to whom anything with feathers is a target at which to shoot, or any nest an object for spoilation. Most of these persons are residents, but a large number are pot hunters and skin and egg collectors from the neighboring cities. These latter are more numerous than most people think, and at times their tracks can be traced through our woods by the broken bushes, robbed nests and marks of climbing-irons on the trees. The trapping of birds is done openly, without any attempt at concealment, although this and the other methods of destroying our birds are in violation of law. There is no doubt that the indifference of women to the cruelty and suffering occasioned by the fashion of wearing dead birds on their persons is a direct encouragement to many who are naturally depraved and desire an excuse for their actions.

The moral sense of the community must be awakened before the evil can be lessened, and this is best accomplished by the publication of information and the exposure of the facts involved. This information is supplied in the Audubon Society's circulars, which will be sent promptly to anyone interested in the subject. Several of the blank pledges, entitling the person signing to a certificate of membership in the society, have been signed, and it is hoped that many more will be filled out. The undersigned will supply the circulars and blank pledges whenever requested, and will esteem it a favor if parties interested in the movement will forward facts personally known, newspaper clippings, magazine articles or reference to them, and anything else bearing upon the subject.

Local facts in regard to the destruction of any species, the abandonment of localities on account of persecution, the work of professionals either in egg collecting, shooting, or trapping, &c., are specially desired, as matters of record. It is hoped that the publication of this brief memorandum may call the attention of our citizens to the fact that a branch of the great movement for the protection of our birds is established here, ready to supply and anxious to obtain any information pertaining to the subject.

ARTHUR HOLLICK,
Corresponding Secretary,
New Brighton.

PROCEEDINGS

— OF THE —

Natural Science Association,

OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *September 1886.*

Meeting called to order at 8.30 P.M.

Mr. George J. Hicks, elected secretary *pro tem.*

The Corresponding Secretary read communications, and the Curator a list of publications received during the Summer.

Dr. N. L. Britton read the following paper upon the results of a cruise along the shores of Staten Island and New Jersey, illustrated with specimens of the objects collected:

A preliminary exploration along the shores of the Lower Bay was made during the second week in August by N. L. Britton, Arthur Hollick and F. J. H. Merrill, of the New Jersey Geological Survey. The party left New Brighton, August 2d, stopping at New Dorp and Crocke's Point. At this latter place were found immense numbers of Sertularian masses, growing attached to the mud of small tidal streams, emptying into Great Kills. The same species had been frequently collected along the beaches, but had never before been traced to its place of growth. The changes constantly occurring on the Point are of great interest. Its elongation is very apparent, from the size of the red cedar trees, which near the extreme end are small and of evidently only a few years growth, while further back they are of increasingly greater dimensions. The rate of elongation can probably be determined by a comparison of old surveys with the new Harbor survey now in progress, when this shall have been completed. The night was passed at Prince's Bay, and it was unusually cold for that season—thermometers in the neighborhood registering as low as 60° F.

August 3d, sailed across the Bay to New Jersey and anchored in Cheese-quakes Creek. The morning was spent on shore, exploring the shell heaps along the bluff near Morgan's station. These shell heaps are in every respect similar to those of Tottenville, from which so many interesting Indian relics have already been obtained. The most abundant shells are of the round clam and oyster, but with them are a few of the soft clam and whelk. On a former occasion a single specimen of *Solecurtus Caribæus* was found. The results of the explorations were 14 fragments of pottery, 4 net sinkers, 1 arrow head, 2 chipped flints, a large number of flint chips and flakes, 1 stone, glazed on the surface, evidently through the action of fire, a portion of a pestle, and a tooth, portion of a horn, and numerous fragments of the skeleton of a deer, of which pieces had been found on previous occasions. The Yellow Drift is well exposed at this point, lying immediately under the shell heaps and overlying the Cretaceous clays, the face of the bluff having been cut away during the construction of the N. Y. & L. B. R. R. At the mouth of the creek were collected many fine specimens of red algæ, mostly of the genus *Callithamnion*, which were found to be sterile. Attached to them in a number of instances were green diatoms of the genera *Navicula* and *Gomphonema*.

Keyport was the next objective point, but a heavy wind compelled a return to Staten Island, near Pleasant Plains, from whence the bluff at Prince's Bay was visited. The lower portion of this mor-

aine, and indeed in some places nearly all of it, is more or less stratified. The band or mass of Yellow Drift, described in the Proceedings of the Association for November 8th, 1884, is now very well exposed, and is so prominent that it may be discerned from a considerable distance on the water. A large boulder of Niagara Limestone, containing fossils, and also one of a white crystalline limestone, containing graphite and coccolite, were found. A large rounded mass of quartz-syenite, containing crystals of black hornblende, and weighing several tons, is a prominent object on the beach. Glaciated stones are abundant. During the afternoon a second attempt was made to reach K-yport, but it failed, and the night was spent on South Beach, near New Dorp.

August 4th, sailed across to Atlantic Highlands, N. J. At this place the Lower Marl bed is well exposed in a bold irregular bluff, which has suffered considerably from the inroads of the water. Land slides have been frequent, some of immense extent. One in particular has displaced the entire side of a good sized hill.

On the beach were found a few rolled fossils, washed from the marl. Cucullæas and a bent cephalopod, probably of the genus Hamites or Helicoceras. At Hilton Park dock the Red Sand bed, which immediately overlies the Lower Greensand Marl, is seen in good outcrops. Portions of this were found crowded with casts of fossils, and the afternoon was devoted to their collection. The great sow-thistle, (*Sonchus arvensis*, L.) was a conspicuous object at one point on the shore. The formation of a red-brown conglomerate, by the cementing of yellow drift pebbles with sesqui-oxide of iron, is a matter of great interest and may be seen to advantage at the base of the bluff, where the iron-bearing waters find their exit. It has formed around stakes driven in the beach, and frequently encloses pieces of drift wood and leaves of living species of plants. The conglomerate thus formed is identical in appearance with the rock occurring so plentifully in the Yellow Drift, hence these conglomerates can not be considered as

characteristic of any one horizon of the Post Tertiary system. Copperas occurs in places as a beautiful efflorescence on the surface of pyritous marl, at first white, but soon turning yellow. A single turkey buzzard was seen, which was evidently an object of annoyance to the fish hawks, one of which birds finally engaged it in battle. A series of graceful manoeuvres ensued, on the part of the buzzard, who would turn over at each lunge of the hawk, thus presenting its beak and talons for defence at the right moment. After a number of such acts it finally sailed away slowly, apparently unruffled.

Aug. 5th—Finding that the collection of fossils, some hundreds in number, were in danger of deterioration, owing to the friable nature of the sand containing them, the morning was spent soaking them in glue water. In the afternoon Sandy Hook was visited and a few plants collected, but nothing of special interest secured. The night was again spent at Atlantic Highlands, near Hilton Park dock.

Aug. 6th—Sailed back to Staten Island, touching at New Dorp and finally stopping at Tottenville. A few shells were obtained on the beach at Ward's Point, among them single specimens of *Triformis nigrocinctus*, *Nassa vibex* and a young *Lacuna vineta*. A brief hunt in the shell heaps yielded a hammerstone and several net sinkers. The scarlet fruited thorn (*Crataegus coccinea*, L.) was noted, in fruit, where it had been found a few months previously by Mr. Wm T. Davis. It has not yet been catalogued in our list of plants, and this is its only known locality on the Island.

Aug. 7th—A driving rain storm put a stop to any extensive explorations, but some fine specimens of fossil leaves were found on the beach at the base of the bluff. They are in all respects similar to those previously found there, and will be carefully drawn and studied with the others.

Aug. 8th—Sailed around to New Brighton through the Sound and Kills.

Adjournment at 9.45 o'clock.

PROCEEDINGS

— OF THE —

Natural Science Association, OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *October 1886.*

Meeting called to order at 8 30 P.M.

Mr. L. P. Gratacap elected chairman
pro tem.

Dr. N. L. Britton presented the following additional notes on the geology of the Island:

No new outcrops of granite have been discovered in any of the cuttings or borings recently made, and indeed the only known outcrop, that at Tompkinsville landing, has been partially covered by the Rapid Transit Railroad. It is to be noted however that this coarse granite contains oligoclase feldspar in addition to the orthoclase, and the probability is that the outcrop is the exposed top of a mass, perhaps a vein similar to those of common occurrence on New York Island. Allusion has often been made to the outcrop of hornblende rock at Brighton Point. This is an extremely tough fibrous tremolite, hardly any other mineral being present in it; it showed no bedding planes and is similar to that which was taken from the bottom of the deep driven well at Bischoff's brewery. It is now wholly concealed by the made land around St. George landing.

The serpentine and talcose rocks which form the main ridge of the Island have been re-examined with considerable care, with the result of confirming the conclusions previously reached. Microscopic examination of the rock reveals the presence of much partially altered amphibole; this fact, and the character of the rock from the well boring before mentioned makes it probable that hornblende or tremolite strata, as well as magnesian limestones, have been the rocks from which our serpentines were derived. This conclusion is now reached from the following additional considerations:

1st, the absence of any proof that these serpentines are metamorphosed igneous rocks.

2d, there is abundant evidence that these rocks are stratified, although this feature cannot be made out in every outcrop. The following observed dips and strikes from various portions of the area indicate the truth of this statement:

Cor. Westervelt avenue and Second avenue, New Brighton, strike, N. 45 E., dip, 70 N. W.

Summit of the northwest side of Pavilion Hill, strike, N. 45 E., dip 70 to 85 N. W.

Eastern side of Pavilion Hill, 900 feet west of the granite outcrop on the shore, strike, N. 45 E., dip, 70 N. W., to nearly vertical. (At this point the rock is delicately crumpled)

West of Garretson's station, strike, N. 60 E., dip, 20 to 80 S. E., and much contorted, apparently lying in several gentle folds.

West of Grant City, strike N. 60 E., dip, 55 to 70 N. W.

Ravine near Egbertville, strike N. 75 E., dip, 85 S. E.

Meissner avenue near Richmond, strike, N 80 E., dip, 80 N.

One-fourth mile northwest of this last outcrop, strike and dip are the same.

In the valley of the brook, one mile north of Egbertville, strike, N. 50 E., dip, 40 to 50 N. W.

3d, All the serpentine areas of southeastern New York and vicinity lie in the the same general line of strike and appear to occupy a well defined belt in the surrounding gneisses and schists. The outcrops may indeed be but portions of the same strata alternately buried by the push of the folds and again brought to the sur-

face by faults of vertical throw, as has been demonstrated in the Highlands of New Jersey. The crystalline limestone areas of New York Island and Westchester County lie parallel or nearly so with this serpentine and its associated minerals, and their detached occurrence is probably due to the pitch and fault structure before noted. Crystallized limestone occurs in and with the serpentines at W. 59th St., New York, and at New Rochelle. At the former locality parts of the rock are indistinguishable from parts of the Staten Island material. The cleavage of the serpentines is similar to that of the limestones, and on the cleavage faces of the latter there is often seen a development of tremolite, while on the serpentine faces there is considerable amianthus. This tremolite is sometimes in the form of so-called "Mountain leather," as is the case in the crystalline limestone at Pleasantville, Westchester Co., N. Y., while in our own serpentines a modification of amianthus has been found, matted into a substance similar to this "Mountain leather," as noted in the Proceedings of Feb. 9th, 1884.

The parallel metamorphism of schists in the production of these serpentines is indicated in the occurrence, on Todt Hill, of a very soft schistose rock, apparently now chloritic, containing altered crystals of tourmaline, a mineral quite abundant in the schists of New York Island.

Doubtless our rocks were originally deposited in a conformable sequence, but the serpentines were left on top in the folding of the strata. The idea advanced by me that the serpentine ridge is an anticlinal fold must be abandoned in the light of more recent investigations. It is quite evidently made up of a series of of smaller folds, which collectively are probably of synclinal structure. The original hypothesis of the south-westward extension of the crystalline rocks across New Jersey has been lately confirmed in a well boring at Perth Amboy, where gneiss was reached at a depth of 70 feet, over which, in succession, were Triassic shale, Cretaceous clay and sand, Pre-Glacial Drift and Moraine.

The finding of fossil vegetable remains in the Cretaceous clays at Kreischerville

was noted in the Proceedings of February 13th, and it should be recorded that considerable additions to our fossil flora have lately been obtained by Mr. Hollick, from the ferruginous sandstone on the shore at Tottenville, which was first noted in the Proceedings of December 8th, 1883.

An outcrop of Pre-Glacial Drift was discovered within the past six weeks, near Woodrow, at a considerable elevation, though not as high up as the great deposit on Todt Hill.

In the limonite iron ore beds on Todt Hill there is a small amount of pyrite, which by oxidation gives rise to coppras, a mineral not before noted here. These ore beds, I am now inclined to believe, are the result of decay in the serpentine, although the presence of much silicious matter with the ore, and of magnetic iron sand in places, indicate deposition from solution and mechanical transportation of part of the material.

An interesting feature of glaciation which had escaped my notice until recently, is the fact that there exist several well defined, nearly driftless areas north and west of the terminal moraine. One of these is on Pavilion Hill, Tompkinsville, where there are but very few erratic boulders and the serpentine comes directly to the surface. This is by no means the highest ground in the vicinity, but the ice sheet appears to have flowed around it, there being well marked moraines on both sides. The greatest elevation is farther to the southwest, where the drift material is heaped up on the serpentine ridge. It appears as though Pavilion Hill diverted the course of the ice flow towards the Narrows, and that it was not overridden.

Mr. William T. Davis reported *Papilio Ajax* as an addition to the local list of butterflies. It was observed on July 5th, near Bull's Head, but eluded capture. Mr. Davis also stated that on cloudy or hazy nights, in the vicinity of St. George, the notes of birds passing over was very noticeable. As this had not been previously observed it was suggested that probably the glare of the electric lights, used for the first time this season, may have altered the former course of migration, or perhaps concentrated it more towards this point.

Adjournment at 10 15 o'clock.

PROCEEDINGS

— OF THE —

Natural Science Association,

OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *November*, 1886.

Meeting called to order at 8.30 o'clock.

This being the annual meeting reports of officers for the past year were read and accepted.

The treasurer reported an income, including balance from previous year, of \$207 50, and expenditures amounting to \$150.25, leaving a balance of \$57.30

The recording secretary reported 47 names upon the roll of active membership and 7 honorary members.

The curator reported an addition of 43 books and pamphlets to the library, most of them due to exchanges for the Proceedings of the Association. In addition to these there have been 87 donations to the museum. The herbarium of Dr. N. L. Britton, containing nearly all the plants thus far found on Staten Island, has been placed in the custody of the Association, and has had a special cabinet built for its proper care and preservation.

The corresponding secretary called attention to notices of the meetings in various scientific publications, also to the results of the Audubon Society work, and correspondence in connection with it.

The election of officers for the coming year resulted in the re-election of the former incumbents, as follows: President, A. L. Carroll, M. D.; Rec-Secretary, Ernest A. Congdon; Corr-Secretary Arthur Hollick; Treasurer, Samuel Henshaw; Curator, Wm. T. Davis.

Mr. Hollick called attention to the fact

that this was the sixth annual meeting of the Association and read the following facts and remarks in connection with it:

The idea of starting a scientific association was often broached long before any steps were taken to test it. On Friday, September 9th, 1881, Dr. N. L. Britton, Dr. F. Hollick and myself happened to be together and incidentally talked the matter over. A preliminary list was finally made out of people whom we thought might be interested and these were communicated with in an informal way whenever opportunity offered. A small note book was started circulating, in which any one desirous of joining in the movement was requested to inscribe his name. When it was ascertained that a sufficient number were interested an invitation was issued, signed by N. L. Britton, Arthur Hollick and W. T. Davis, to meet at the residence of Mr. Davis on Saturday, November 12th, 1881. On that evening the following fifteen residents of the Island responded to the call: Sander son Smith, A. L. Carroll M D, B. J. Carroll, Wm. T. Davis, Arthur Hollick, Samuel Henshaw, N. L. Britton, Chas. W. Leng, W. G. Berry, E. F. Neilson, E. F. Birmingham, E. C. Delevan Jr., Chas. W. Butler, G. W. Wright, and Wm. Chorlton.

An organization was perfected, constitution and by laws adopted, and the name, Natural Science Association of Staten Island chosen. To our credit be it said

that ten of the above names are yet upon our roll of membership, two have removed from the Island and only three have seen fit to resign. For some time we lived a sort of nomadic existence, dependent upon the kindness of the Trustees of Public School No. 3, and the Young Men's Catholic Union, for a roof under which to meet. It was not until April 8th, 1882; that we finally moved into our present quarters, offered to us free, through the kindness of the Village Trustees. From this time on we waxed strong, and after a test of four years decided that we were a sufficiently permanent feature of the Island to claim a corporate existence, and hence, on the 19th day of February 1885, filed our certificate of incorporation.

And now, what have we done to justify our existence? Individually and collectively we have compiled and printed the following catalogues:

Flowering and Vascular Cryptogamous Plants, numbering 1,211 species

Birds known to breed here, numbering 69 species.

Butterflies, with subsequent additions, numbering 68 species.

Mammals, with subsequent additions, numbering 21 species.

Rhizopoda, numbering 62 species.

Reptiles and Batrachians, numbering 35 species.

Our list of shells numbering 115 species is in the hands of the printer at the present time.

The beetles are under way—the preliminary lists of the Coccinelidae, Cicindelidae and Carabidae having already been published in our proceedings. The geology and mineralogy have been published in pamphlet form, with additions in our proceedings. A preliminary list of about 55 drift fossils is in manuscript. The crustaceans, numbering a few over 100, and the orthopterous insects with about 50 species are almost ready for publication and may be expected shortly.

Local history and archæology have received considerable attention, with very

satisfactory results, and numerous notes, memoranda and papers in regard to a variety of other local matters have been placed upon permanent record. Not only have our facts been recorded, but in nearly every instance the specimens themselves are here in our cabinets, to serve as vouchers for what we have published.

Finally, what has our experience thus far taught us, so that we may know how to work to the best advantage in the future? Our proximity to New York and Brooklyn, with their Academy of Science, Microscopical Society, Torrey Botanical Club, Entomological Society &c., would seem to leave no mission for us to fulfil; but in reality it has been our strength, as it has compelled us to confine our attention to local matters instead of indulging in vague scientific generalizations. The absurdity of pretending to compete with our powerful neighbors has been so manifest that I am glad to say it has never been thought of. We do not expect to make any startling announcements in science, but what we can do, what we must do, in order to justify our living, and what every one interested in Staten Island ought to help and encourage us to do, is to continue the work of collecting, classifying, and studying our local material, and making our knowledge of this as complete and our collections as perfect as possible.

It is far better to have a series of our drift rocks or serpentine minerals, an herbarium of our plants, or a collection of our common shells, and to make these perfect in their way, than to have our room become a rubbish shop for so-called "curiosities," such as the first Philadelphia museum is said to have been, where the thigh bone of a mastodon, and a machine for illustrating perpetual motion were placed side by side.

There is plenty of work yet to be done here, and done at once before Rapid Transit, beer saloons, and other evidences of advancing civilization destroy what yet remain of the objects which it should be our earnest endeavor to preserve.

Adjournment at 9 30 o'clock.

PROCEEDINGS

— OF THE —

Natural Science Association,

OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *December 11th, 1886.*

A quorum not being present, no business was transacted.

The following memorandum by Mr. Henshaw was read: *Azolla Caroliniana*, Willd. I first noticed this plant in our lotus pond, about two years ago, and have no doubt it came with some aquatic plants which I received from the South. It was very interesting to me at first, looking like bits of floating moss, and apparently so frail that it was liable to be blown off the surface of the water. It turned out more able to take care of itself than I imagined, however, and the innocent looking plant in a short time covered the whole surface of the water, crowding out the more robust growing *Nymphæas* and making sad havoc with all the permanent plants in the pond. It even tried to climb the stalks of the lotus, and eventually became such a pest that I tried to skim it off the surface of the water; but it appeared to grow all the faster. I turned the hose on it, and tried to float it off, but it is still here and I know of no way to get rid of it without destroying all the other aquatic plants in the pond.

Thinking that it might make itself at home in some of the ponds and streams in the neighborhood, I threw a little of it in the shallow end of Silver Lake, Clove Lake, and along the edges of the swamps. This was on May 10th, 1885. By July 5th of the same year it had spread amazingly, especially in the swamps at the head of Clove Lake, where, by Autumn, it had covered every available inch of surface. Where fully exposed to the sun it assumed a red or rusty appearance and

gave rise to many inquiries on the part of people in the vicinity as to what it was and how it came there.

It has evidently become more or less acclimatized, as it lived through the past Winter and was abundant throughout this year. I think we may venture to put it in the plants of recent introduction.

Mr Wm. T. Davis presented a series of some fifteen specimens of fasciated stems and branches from *Rhus glabra* and *Ailanthus glandulosus*, with the following remarks upon the same:

Deformities in plants are extremely common, but what is termed fasciation is probably the most frequent of all vegetable malformations. It is defined by Dr. Masters in "Vegetable Teratology" in the following words: "In its simplest form it consists of a flat ribbon like expansion of the stem or branch; cylindrical below, the branches gradually lose the pristine form and assume the flattened condition." As a cause of this deformity various theories have been advanced, but it is for the most part conceded that it is due to superabundant nourishment, accompanied sometimes by a retarding influence, such as an injury.

I have observed in my rambles that fire is the chief cause of fasciation in *Ailanthus* and sumach, but it does not appear to have been mentioned as a producer of this deformity.

Along the stone wall on the property of the Sailors' Snug Harbor the vegetation has been burned for several years, the dead stalks standing thick among the Summer's growth. After the fire in the

Spring of 1885 many of the young ailanthus trees became fasciated, the adhesion of branches numbering four and five in some cases; and I counted over twenty good specimens of these deformed stalks in quite a small area. I noticed also that most of the young trees had lost their cylindrical outline and had become extremely angular, though after a whole Summer's growth they failed to develop a fasciated stalk. On the other side of the wall, where there had been no fire, the ailanthus trees were entirely normal. In the Spring of this year these bushes and young trees were again subjected to the influence of fire, and as the Summer proceeded I noted a new growth of deformed ailanthus trees and also a number of fasciated sumach stalks.

Early this Spring I discovered a locality in the vicinity of Richmond, where the blackened stems of the sumachs showed plainly that there had been a fire, and in the Summer the leaves as well as the stalks became fasciated. Other leaves, though normal in shape and showing signs of adhesion were much enlarged. The flowers growing on these fasciated stalks, which are also for the most part deformed, are not borne in a single head but extend a long way down the branch, intermixed with the leaves. This fact seems to prove more conclusively that the adhesion of many branches and not the expansion of one, is the true theory of fasciation.

A great many districts are burned over in the Fall, but I think it is only the fires that take place after growth has commenced in the Spring that produce this result.

I have noticed fasciated branches on other ailanthus trees, that had not been subjected to fire. In one case the bark had been injured and in another the main tree had been lopped off, the young shoots producing this malformation.

Mr. Hollick made the following brief remarks in regard to glaciation on the Island:

Glacial striations can seldom be seen here, for the reason that most of our serpentine rocks are too soft to preserve such marks, and the harder rocks are not sufficiently exposed. One locality, on the shore at New Brighton Point, formerly afforded a fine chance to study the glacial striae, where the hard tremolite outcrop was exposed. Dr. Britton has noted this in the Trans. of the N. Y. Acad. Sci. for December 12th, 1881, and gives the direction of the striae as N 15° to 17° W. It is needless to add that this is no longer accessible, as it has been covered by the Rapid Transit R. R. The trap ridge however, from Port Richmond to Linoleumville, ought to show the effects of glaciation, and this I found to be the case, wherever the covering of drift is removed. A small portion of the surface is exposed near the corner of Innis and Grand streets, Port Richmond, and here the striae are N. 13° W. At the quarry just south of Washington avenue, the compass bearing was N. 20° W. It is desirable that the direction should be noted at other points, and advantage should be taken of every chance exposure that is made.

The Corresponding Secretary called attention to the death of Mrs. Thos. Say, at Lexington Mass., on November 15th, who was the first person chosen as an honorary member by the Association.

The President called attention to the death of the Hon. Erastus Brooks, and suggested that some formal action be taken at the next meeting.

Messrs. Eadie and Hollick presented several Indian implements, and a tooth, lately unearthed at Old Place, and stated that interesting developments were to be expected there shortly.

PROCEEDINGS

— OF THE —

Natural Science Association, OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *January 8th, 1886.*

After the election of three new members, and the transaction of other business, Mr. Gratacap offered the following remarks on the drift fossils of Staten Island, accompanied by a list of species to be published as an extra:

Many Palæozoic fossils have been brought to the Island through the transporting agency of ice during the great Ice Age from the fossiliferous areas of New York, many miles north of their present position, and the exact origin of many of them can be pointed to with certainty. They are forms belonging to the Cambrian, Lower Silurian, Upper Silurian, and Devonian rocks, and represent the subdivisions of these larger periods, named by the New York survey as Potsdam Sandstone, Hudson River Slates, Lower Helderberg Limestone, Oriskany Sandstone, Schoharie Grit and Hamilton. Many gaps in this series are noticeable, and it seems most probable that fossils from the missing formations, as the Clinton and Upper Helderberg, will yet be found, when the morainal areas of our Island have been more carefully explored. Fossils from the Clinton rocks have been collected on Long Island, and south and west of us the yellow gravels of New Jersey have yielded coral forms from the Upper Helderberg. We may expect to see these turn up amongst us. Naturally the surface finds, except in cases of larger masses, will be poor, as the weathering action of frosts and rains destroys the soft fossiliferous fragments, or defaces their organic impressions. In the case of good-sized boulders, such as have yielded the Lower Helderberg and Schoharie forms, the developments are excellent, as upon breaking them open the fresh surfaces yield rich results. The quarry which needs working is probably the terminal moraine, and the bluff at Prince's Bay, as this heavy blanket of drift material holds the scouring of the north country, and keeps even small specimens well preserved within its depths. An examination of the material collected shows that we have 50 species of these palæozoic fossils, the larger number of species coming from the Lower Helderberg, Oriskany and Schoharie groups, and as the last-named has only a local development, being found solely in Schoharie County, N. Y., we can confidently refer the specimens of this rock to that locality, about 130 miles north of us.

In this connection it is interesting to

note that the average direction of the glacial striæ on the Island, N. 14° W., as observed by Dr. Britton and Mr. Hollick, if prolonged Northward in a straight line, crosses the Catskill, Chemung, Portage, Hamilton, Upper and Lower Helderberg, Oriskany, Schoharie, Marcellus, Clinton and Hudson River groups, and while many of the areas traversed are not especially rich in fossils, as the formation has only a pinched out existence, yet we should confidently look for large accessions to our palæozoic fauna in the future. The Coralline Limestone lies also in the track of this glacial movement, but the characteristic Niagara, being developed farther West, would scarcely reach our shores. Another source of contributions of this sort is the Hudson River valley, and the Potsdam sandstone specimens holding *Scolithus linearis*, Hall, as well as the examples of the Hudson River flags, have most likely travelled to us over this route. The list offered is therefore provisional and may be greatly extended. The localities are seen to be widely separated with no special significance as to the fossils they afford. For the material from which the list has been made I am indebted to Messrs. Britton, Hollick, Davis, Carroll, J. Raymond, Congdon and Cisco.

Mr. W. T. Davis gave a short account of two interesting insects from the Island. A few years ago a species of earwig was found in great numbers on the shore at Camp Washington but owing to the filling in by the Rapid Transit R. R. they have probably become extinct. A few of these were sent to Mr. Samuel H. Scudder, of Harvard College, and in answer he replied in part as follows: "The species (*Anisolabris maritima*) never acquires wings. I have never seen it before from this country North of North Carolina." The habitat of the insect has been given as Europe, and thence nearly the whole world, but it is chiefly reported from warm latitudes.

The other insect is a grasshopper not uncommon on the sandy ground at Totenville and Watchogue. Mr. Scudder writes in a letter to Mr. Henry Edwards. "The Acridian which Mr. Beutenmuller gave me is, as I thought, *Spharagemon collaris*, Scudd., and is now known for the first time, so far as I am aware, from east of the Alleghanies, or even of the Mississippi."

PROCEEDINGS

— OF THE —

Natural Science Association,

OF STATEN ISLAND.

12

VILLAGE HALL, NEW BRIGHTON, *January 8th*, 1886.

Meeting called to order at 8.10 P.M.—
The President in the chair and 12 persons present.

After the business of the evening had been transacted, Mr. Hollick read the following paper upon the size and probable age of a number of our trees.

Our forest growth is disappearing so rapidly, and so few large trees yet remain here, that whatever facts or memoranda we may know of in regard to the subject should be carefully recorded. There is hardly a patch of woodland on the Island which is of more than fifty years growth, and the number of individual trees which are a century old or upward is very small. Some of these trees are conspicuous and well-known objects, while others are so far from routes of travel as to be known to but few people. It has been my habit, while tramping through the woods and over the fields, to measure the circumference of any tree that arrested my attention on account of its size, and in that way I believe I have succeeded in obtaining memoranda in regard to nearly all that are remarkable in this respect. Some are no doubt destined to be destroyed within a comparatively short time for economic purposes, while the natural symmetry and beauty of others have been already marred in a spirit of thoughtless vandalism. For instance, there is a tree of *Amelanchier*, commonly known as the "shad bush," growing in a hedge row near the Billopp house at Tottenville. When in full blossom, which generally occurs about the middle of May, and before the leaves are out, the tree appears like a bank of snow at a short distance and cannot fail to catch the eye at once. It was formerly

almost perfect in symmetry, but some eminently practical person actually hacked one of the largest main divisions partly through and bent it down to form part of a nondescript fence!

The large holly trees in the neighborhood of Richmond have suffered even worse mangling than this, owing to the periodical raids made upon them for Christmas greens. Some of the trees have been cut down entirely, others have had every branch lopped off and there is hardly one but what has suffered more or less. Probably the largest one on the Island grows in a rather out of the way field near Giffords, and was not molested until a few years ago. It was a perfect cone in shape, and when in full Winter dress, with evergreen leaves and bright scarlet berries, was well worth a journey to see. Several of the large branches on one side were however cut off one Winter, and its perfect beauty spoiled.

An enormous grape vine, with a trunk almost two feet in circumference, formerly grew in the ravine at Egbertville, but it was cut in two about a year ago, apparently in mere wantonness, and its dead branches may still be seen clinging to the tree over whose top it had clambered.

The following figures represent the circumferences of the trees which are most remarkable for their size:

Chestnut, ravine in hills north of Garretsons,	18ft.
White oak, field south of R. R., near Garretsons.....	17ft. 8in.
White oak, field, near Green Ridge.....	15ft. 2in.
White willow, Billopp House, Tottenville.....	13ft. 7in.
Red maple, woods near Billopp House, Tottenville.....	12ft. 3in.
White oak, north side of Turnpike, between Bulls Head and Four Corners....	12ft. 1in.
Elm, in swamp near school house, Green Ridge.....	11ft. 7in.
Tulip, in woods south of Turnpike, between Bulls head and Four Corners	11ft. 1½in.
White oak, woods north of Amboy road, near Court House.....	11ft. 6in.

These figures should be pretty fair ones with which to calculate for trees of this

Adjournment at 10 o'clock.

PROCEEDINGS

— OF THE —

Natural Science Association, OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *March 12, 1887.*

Meeting called to order at 8.30 o'clock.

Mr. Hollick was elected chairman *pro tem.*

Mr. Kunhardt gave a brief account of natural gas as it occurs in Pennsylvania, with notes upon the methods employed in burning, controlling leaks, distributing, etc.

The following notes upon Staten Island elevations, above the level of the Bay, were presented by Mr. Chas. Keutgen. They were determined by means of an aneroid barometer:

Boyd's Hill, Stapleton, 80ft.; Clove Lake, 140ft.; Summit of St. Paul's ave., 150ft.; Silver Lake, 200ft.; Ecksteins' Brewery, 210ft.; Paper Factory, 230ft.; Ward's Hill 240ft.; House of Jos. Lederle, 290ft.; House of W. B. Duncan, 320ft.; House of J. J. Cisco, 340ft.; small knoll, s. w. of the junction of Ocean Terrace and Todt Hill roads, 380ft. This latter is the highest point on the Island.

Mr. Jas. Raymond presented an old flint lock musket, which was found in a deserted house near Huguenot Heights, and purchased from the owners for a small sum. The date 1759 is engraved upon the metal, and except that the ramrod is lost the piece is in almost perfect condition.

Mr. Henshaw presented the following relics of revolutionary times, unearthed recently upon the estate of Mrs. J. C. Green, where a new street is being cut through: 4 arrow heads, 1 bullet, 1 brass button, 7 coins, amongst which latter were a British half-penny of 1774, a farthing of 1770 and a Macclesfield half-penny of 1791. The remaining ones were too much corroded to determine.

Mr. Davis offered the following addi-

tional memoranda upon the large trees of the Island.

Near the Old Town road is a hollow chestnut, measuring 17ft. 6in. in circumference, thus placing it second in the list of our big trees. It is very crooked and gnarled, making an exact measurement rather difficult. The large chestnut in the ravine back of Garretson's has recently had its main branch or fork cut off about ten feet from the ground. This measured 2ft. 5in. in diameter and showed 141 annual rings. At the end of the first 70 years of its life this fork had a radius of 1ft, while in the succeeding 71 years it only added about $2\frac{1}{2}$ in, showing a rapid decline in its rate of growth. In the Proceedings for Feb. 12th, 1887, the calculated age of this tree was given as 132 years, which will be seen to be very nearly correct. A large white oak, near the Finger-board road, recently felled, is also worthy of notice. It is 2ft. 3in. in diameter, and was evidently forked near the ground in its sapling stage. These forks, coalescing about their eleventh and twelfth years respectively, grew from thence onward as one tree, forming 118 additional rings. The centers of these saplings remained about 4in. from each other and were traceable throughout the log for a distance of 22ft., when they parted, one forming a large branch and the other continuing as the main tree.

Printed copies of the Catalogue of the Mollusca of the Island, by Sanderson Smith, were presented and will be distributed with the current Proceedings. Erratum slips, designed to rectify the error in the date of last Proceedings were shown, and will be distributed at the same time.

Adjournment at 10 o'clock.

Proceedings of the Natural Science Association, OF STATEN ISLAND.

EXTRA No. 5.

VILLAGE HALL, NEW BRIGHTON, *March*, 1887.

CATALOGUE OF THE MOLLUSCA OF STATEN ISLAND,

BY SANDERSON SMITH.

MARINE GASTEROPODA.

Mangilia cerina, (K. and S.) Verr.
Fulgur carica, (Gmel.) Conrad.
Sycotypus canaliculatus, (Linn.) Gill.
**Nassa vibex*, Say.
Tritia trivittata, (Say) H. and A. Ad.
Ilyanassa obsoleta, (Say) Stimps.
**Urosalpinx cinerea*, (Say) Stimps.
**Eupleura caudata*, (Say) H. and A. Ad.
**Purpura lapillus*, (Linn.) Lam.
Anachis avara, (Say) Perkins.
Astiris lunata, (Say) Dall.
**Lunatia heros*, (Say) H. and A. Ad.
Neverita duplicata, (Say) Stimps.
**Natica pusilla*, Say.
**Cerithiopsis Greenii*, (C. B. Ad.) Verr.
Triforis nigroinctus, (C. B. Ad.) Stimps.
Bitum nigrum, (Totten) Stimps.
Crepidula fornicata, Lam.
Crepidula plana, Say.
Crepidula convexa, Say.
**Littorina irrorata*, (Say) Gray.
Littorina rudis, (Maton) Gould.
Littorina palliata, (Say) Gould.
Lacuna vineta, (Mont.) Turton.
Littorinella minuta, (Totten) Stimps.
**Odostomia bisuturalis*, (Say) Gould.
Odostomia tridita, (Totten) Gould.
Odostomia seminuda, (C. B. Ad.) Gould.
Turbonilla interrupta, (Totten) H. and A. Ad.
**Scalaria lineata*, Say.
**Haminea solitaria*, (Say) Verr.
Tornatina canaliculata, (Say) H. and A. Ad.
Actæon punctostriata, (C. B. Ad.) Stimps.

MARINE LAMELLIBRANCHIATA.

**Teredo navalis*, Linn.
**Pholas truncata*, Say.
**Pholas costata*, Linn.
Zirphæa crispata, (Linn.) Morch.
**Martesia (Diplothyra) Smithii*, Tryon.
Mya arenaria, Linn.
Lyonsia hyalina, Conrad.
Clidiophora trilineata, (Say) Carp.
Cochloidesma Leanum, (Conr.) Couth.
Ensatella Americana, (Gould) Verr.
Tagelus gibbus, (Spengl.) Gray.
Macoma fragilis, (Fabr.) H. and A. Ad.
Angulus tener, (Say) H. and A. Ad.
**Tellina tenta*, Say.
**Cumingia tellinoides*, Conrad.
Spisula solidissima, (Dillw.) Gray.
do. var. *similis*, Say.
Mulinia lateralis, (Say) Gray.
Petricola pholadiformis, Lam.
Venus mercenaria, Linn.
* do. var. *notata*, Say.
Callista convexa, (Say) H. and A. Ad.
Tottenia gemma, (Totten) Perkins.
**Lævicardium Mortoni*, (Conr.) Perkins.
**Venericardia granulata*, (Say) Verr.—*Cardita borealis*, Conrad.

**Astarte castanea*, Say.
**Kellia planulata*, Stimps.
**Solemya velum*, Say.
Yoldia limatula, (Say) Stimps.
Nucula proxima, Say.
Scapharca transversa, (Say) H. and A. Ad.
Argina pexata, (Say) Gray.
Mytilus edulis, Linn.
**Modiola modiolus*, (Linn.) Turton.
Modiola plicatula, Lam.
**Pecten irradians*, Lam.
**Anomia glabra*, Verrill.
Anomia aculeata, Gmelin.
Ostrea Virginiana, (Lister) Favanne.
do. var. *borealis*, Lam.

TERRESTRIAL AND FLUVIATILE GASTEROPODA.

Zonites arboreus, (Say) Binney.
Zonites viridulus, (Monk.) Binney.
**Zonites indentatus*, (Say) Binney.
**Zonites minusculus*? (Binn.) Fischer.
**Zonites fulvus*, (Drap.) Binney.
**Zonites suppressus*, (Say) Binney.
Limax agrestis, Linn.
Limax campestris, Binney.
Patula alternata, (Say) Binney.
Patula striatella, (Anth.) Morse.
**Tebennophorus Caroliniensis*, (Bosc.) Binney.
Helicodiscus lineatus, (Say) Morse.
**Pupa armifera*, Say.
**Pupa contracta*, Say.
**Pupa rupicola*, Say.
Pupa fallax, Say.
Vertigo Gouldii, (Binn.) Stimpson.
**Vertigo ovata*, Say.
Strobila labyrinthica, (Say) Morse.
**Stenotrema hirsuta*, (Say) Tryon.
Triodopsis tridentata, (Say) Tryon.
Mesodon albolabris, (Say) Morse.
Mesodon thyroides, (Say) Tryon.
Vallonia pulchella, (Mull.) Binney.
Succinea avara, Say.
Succinea aurea, Lea.
**Succinea obliqua*? Say.
Succinea ovalis, Gould, non Say.
Alexia myosotis, (Drap.) Pfeiffer.
**Carychium exiguum*, (Say) Gould.
Melampus lineatus, Say.—*Mel. bidentatus*, Say.
Lymnaea desidiosa, Say.
Lymnaea humilis, Say.
Lymnaea columella, Say.
**Physa heterostropha*, Say.
**Planorbis trivolvus*, Say.
**Planorbis parvus*, Say.
**Planorbis deflectas*, Say.

FLUVIATILE LAMELLIBRANCHIATA.

**Sphaerium securis*, Prime.
Sphaerium partumeium, Say.
Pisidium abditum, Hald.
Anodonta fluviatilis, Lea.
Anodonta? a small species.

* Species preceded by an asterisk are not abundant.

For notes on the above list see Proceedings for June 12th, 1886.

March 1887

1887

PROCEEDINGS

— OF THE —

Natural Science Association,

OF STATEN ISLAND.

EXTRA No. 6.

VILLAGE HALL, NEW BRIGHTON, *March*, 1887.

PRELIMINARY LIST OF PALAEOZOIC FOSSILS FOUND IN THE DRIFT OF STATEN ISLAND.

The following list has been prepared from specimens collected by Messrs. Britton, Wm. T. Davis, Hollick, Congdon, B. Carroll, Eadie, Jas. Raymond and Cisco. It will doubtless be enlarged by subsequent additions, when the Drift areas of the Island have been more thoroughly explored and examined. Nearly all the specimens are now in the possession of the Association and may be seen in the cabinet.

For notes upon the subject I would refer to the Proceedings of the Association for January 8th, 1887,

L. P. GRATACAP.

SPECIES.	FORMATION.	LOCALITY.
<i>Scolithus linearis</i> , Hall.	Potsdam.	{ Fort Wadsworth, Princes Bay, Tottenville.
<i>Orthis testudinaria</i> , Dalman.	Hudson River.	{ Rossville, Princes Bay, Brighton Heights.
<i>Strophomena alternata</i> , Conrad.	" "	Princes Bay,
<i>Leptaena sericea</i> , Sowerby.	" "	Rossville, Brighton Heights.
<i>Ambonychia radiata</i> , Hall.	" "	Kreischerville.
<i>Orthodesma parallela</i> , Hall.	" "	" "
<i>Streptelasma strictum</i> , Hall.	Lower Helderberg.	Brighton Heights.
<i>Aspidocrinus scutelliformis</i> , Hall.	" "	Princes Bay.
<i>Fenestella precursor</i> , Hall.	" "	Brighton Heights.
" <i>nervia</i> , Hall.	" "	" "
<i>Trematopora corticorsa</i> , Hall.	" "	" "
" <i>regularis</i> , Hall.	" "	" "
<i>Lingula rectilatera</i> , Hall.	" "	Huguenot.
<i>Orthis oblata</i> , Hall.	" "	Brighton Heights.
<i>Strophomena rhomboidalis</i> , Wahl.	" "	" "
<i>Strophodonta Beckii</i> , Hall.	" "	Huguenot.
" <i>Headleyana</i> , Conrad.	" "	" "
<i>Leptaena concava</i> , Hall.	" "	West New Brighton.
<i>Spirifer macropleura</i> , Conrad.	" "	Princes Bay.
" <i>cycloptera</i> , Hall.	" "	Brighton Heights
" <i>perlamellosa</i> , Hall.	" "	" "
" <i>concinna</i> , Hall.	" "	" "
<i>Atrypa reticularis</i> , Linn.	" "	Princes Bay
<i>Merisia arcuata</i> , Hall.	" "	West New Brighton
<i>Trematospira concava</i> , Hall.	" "	Brighton Heights.
<i>Rhynchonella</i> sp?	" "	West New Brighton.
" "	" "	Princes Bay.
<i>Eatonia peculiaris</i> , Conrad.	" "	" "
<i>Dalmanites nasutus</i> , Conrad.	" "	Brighton Heights.

SPECIES.	FORMATION.	LOCALITY.
<i>Spirifera arenosa</i> , Conrad.	Oriskany.	Todd Hill.
" <i>arrecta</i> , Hall.	"	Princes Bay.
" <i>tribulitis</i> , Hall.	"	" "
<i>Cyrtina rostrata</i> , Hall.	"	" "
<i>Merista lata</i> , Hall.	"	" "
<i>Rhynchonella multistriata</i> , Hall.	"	Brighton Heights.
<i>Spirophyton Cauda-Galli</i> .	Schoharie.	?
<i>Zaphrentis</i> sp?	"	Camp Washington.
<i>Syringopora Hisingeri</i> , Billings.	"	West New Brighton.
<i>Heliophyllum exiguum</i> , Billings.	"	" " "
<i>Favosites Emmonsii</i> , Rominger.	"	" " "
<i>Cyathophyllum rugosum</i> , Ed. & H.	"	" " "
This latter may prove to be		
<i>Phillipsastraea Verneuilii</i> , Ed. & H.)	"	" " "
<i>Chonophyllum conatum</i> , Hall.	"	" " "
<i>Lichenalia concentrica</i> , Hall.	"	" " "
<i>Fenestella</i> sp?	"	" " "
<i>Cryptopora mirabilis</i> , Nicholson.	"	" " "
<i>Orthis alsus</i> , Hall,	"	" " "
" <i>peloris</i> , Hall.	"	" " "
<i>Strophodonta ampla</i> , Hall.	"	" " "
" <i>inequiradiata</i> , Hall.	"	" " "
" <i>parva</i> , Hall.	"	" " "
" <i>perplana</i> , Conrad.	"	" " "
" <i>demissa</i> , Conrad.	"	" " "
<i>Strophomena rhomboidalis</i> , Wahl.	"	Camp Washington.
<i>Atrypa impressa</i> , Hall.	"	" "
<i>Rhynchonella</i> sp?	"	West New Brighton.
<i>Pentamerus aratus</i> , Hall	"	" " "
<i>Conocardium attenuatum</i> , Conrad.	"	" " "
<i>Cyrtolites curvilineatus</i> , Conrad.	"	" " "
<i>Orthoceras Pelops</i> , Hall.	"	" " "
<i>Cyrtoceras Eugenium</i> , Hall.	"	" " "
<i>Proetus crassimarginatum</i> , Hall.	"	" " "
<i>Dalmania Anchiops</i> , Green.	"	Camp Washington.
<i>Spirifera mucronata</i> Conrad.	Hamilton.	{ Silver Lake,
		{ Richmond.
<i>Favosites</i> sp?	Upper Helberberg	?
<i>Meristella nasuta</i> , Conrad.	" "	?

PROCEEDINGS

— OF THE —

Natural Science Association,

OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, April 9th, 1887.

Meeting called to order at 8.45 o'clock.

Mr. Arthur Hollick was elected chairman *pro tem* and Mr. Geo. J. Hicks, secretary.

On motion of Dr. N. L. Britton, the President was empowered to appoint a committee of three, including himself, to represent the Association in all matters that may arise in consequence of the proposed meeting of the American Association for the Advancement of Science, in New York, during the coming Summer. The Corresponding Secretary called attention to the blanks that had been prepared for applications and permits to collect birds and eggs, under Chapter 427 of the laws of 1886, and stated that a notice would be prepared for publication, calling attention to the provisions and requirements of the law.

Printed lists of the fossils found in the Drift of the Island by Mr. L. P. Gratacap were presented, and will be distributed with the current Proceedings.

Dr. N. L. Britton exhibited and remarked upon the specimens of fungi collected by members of the Association during the past two years.

The specimens were named by Mr. J. B. Ellis, of Newfield, New Jersey, the eminent authority in this department of botany. So far the collection consists almost entirely of the larger and more striking species, little attention having been paid to microscopic forms. Forty-two species, included in twelve genera, were shown, and about an equal additional number have been collected, which will be the subject of remark at a subsequent meeting. These are all contained in the cabinets of the Association. The largest specimen yet collected on the Island is of the species *Polyporus applanatus*, Fries, which grows on the trunks of trees, and attains a diameter of a foot

or more. It is very hard and woody, its upper surface marked by concentric smooth ridges, nearly white in color, the lower surface duller and provided with an immense number of minute holes or pores from which its generic name *Polyporus*—many pored—is derived. These pores contain the exceedingly minute spores, the bodies which reproduce the plant, as the seeds of flowering plants reproduce the latter. Many other species of *Polyporus* were shown, among them the *P. betulinus*, common on the white birch, and distinguished from the above mentioned one by its incurved margin and smooth upper surface. *P. hirsutus* has the upper surface densely covered with short hairs, and *P. versicolor* is marked by concentric bands of various colors.

The genus *Agaricus*, which contains the edible mushroom and the toadstools, is as yet but poorly represented in the collections, the species being difficult to preserve. These plants have the under surface provided with plates of tissue, called gills, on which the spores are borne. There are probably more than one hundred different species of *Agaricus* in our territory.

Puff balls are represented by several genera and many species. The "Earth-stars," which have the curious property of opening in dry weather and closing in wet, are allied to these.

In closing, Dr. Britton remarked: There is no more inviting field in all natural history than the study of fungi, and inasmuch as practically nothing has yet been done toward the collection and determination of the forms found on Staten Island, there is an excellent opportunity for some member of the Association to take up this investigation. The collections now made will, at all events, serve as a nucleus for this work.

Adjournment at 10 o'clock.

PROCEEDINGS

— OF THE —

Natural Science Association,

OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *May 14th, 1887.*

Meeting called to order at 8.20 o'clock.

Mr. L. P. Gratacap elected chairman pro tem.

The Corresponding Secretary called attention to the fact that the bill introduced in the Assembly by the Association, amending the bird protection act of last year, had passed both branches of the Legislature, and would in all probability become a law. On motion of Mr. G. W. Wright, the Corresponding Secretary was instructed to transmit the thanks of the Association to Assemblyman Moore and Senator Murphy for their successful efforts in its behalf.

Mr. Wm. T. Davis exhibited a young live fox, probably about seven or eight weeks old. It gnawed a pencil belonging to one of the members, and once in a happy frame of mind pranced about the table. It has proved itself a very observing little animal, prying into every nook and cranny in house and garden, and when passing under any object it generally stops to eye it carefully. When the box was being made, in which it spends a portion of its existence, it showed its great interest in the novel apparatus in use by carrying off the nails, biting the awl, and running in circles about the improvised carpenter. It will lay on its back in the sun shine, biting the legs of the chairs or its own tail, out of which it occasionally pulls pieces of the wool with which it is yet mostly covered, and after in-

specting these a while, usually eats them up. Though very friendly with those it sees often, it is sometimes suspicious of strangers and on one occasion a man running through the garden so frightened it, that scampering to a 'den' under a thick growth of honey suckle, it remained hid for quite a while. Toward evening it is much more active, and is more likely to frisk about, and follow those walking in the garden; but if left too far behind in the grass, it will stop and give three or four quick barks, denoting its displeasure. This bark, a plaintive whine when shut up, or when hungry, together with a very intelligent little face are each expressive in their way, and subject to great variation in tones and looks, so that Vulpes, at least when a baby, is a very amusing pet.

Dr. N. L. Britton presented a mounted specimen of a mink, (*Putorius vison*), which was killed early this Spring near the foot of New Dorp Lane, where it had made considerable havoc amongst the poultry.

Mr. E. M. Eadie presented a fine specimen of a stone axe and several arrow heads from Watchogue. Also two arrow heads, presented to the Association by Mr. L. W. Freeman, of Old Place.

Dr. N. L. Britton offered the following notes upon the relative times of flowering of several shrubs and trees, for the seasons of '86 and '87:

PLANT.	APRIL 18, 1886.	APRIL 17, 1887.
Shad Bush	Leaves unfolding.	Leaves unfolding.
White Willow	Buds starting.	Buds not started.
American Elm	In full bloom.	In bloom.
Dogwood	Not started.	Not started.
Peach	Buds $\frac{1}{2}$ in.	Buds $\frac{1}{2}$ in.
Spice Bush	In partial flower.	In partial bloom.
Trumpet Honeysuckle	Leaves $\frac{1}{2}$ in.	Leaves 1 in.
Japan Quince	Buds unfolding.	Leaves $\frac{1}{2}$ in.
Lilac	Leaves $\frac{1}{2}$ in.	Leaves $\frac{5}{8}$ in.
Red Maple	In full bloom.	In full bloom.
Crab Apple	Leaves $\frac{1}{2}$ in.	Leaves $\frac{1}{2}$ in.
Horse Chestnut	Buds 1 in.	Buds 1 in.
Cherry	Buds $\frac{1}{2}$ in.	Buds $\frac{1}{2}$ in.
High Huckleberry	Buds $\frac{1}{2}$ in.	Buds $\frac{1}{2}$ in.
Wild Cherry	Buds starting.	Not started.
Larch	Buds $\frac{1}{2}$ in.	Buds $\frac{1}{2}$ in.

These observations were made upon the same individuals as those noted in the Proceedings for May 9th, 1885, thus giving a record for four successive seasons.

Mr. L. P. Gratacap exhibited sections of serpentine rock from several parts of the Island, under the microscope, with the following memoranda on the subject:

The Serpentine hills of Staten Island are of very considerable interest in view of the various and contradictory opinions held or advanced in regard to their origin. The theories regarding this important question may be gathered under four heads, first, those that assign it to altered eruptive and volcanic rocks and metamorphic schists; second, those that trace it to replaced sedimentary beds of limestone or dolomite; third, the remarkable and partially endorsed view of Dr. Hunt that it was a chemical precipitate resulting from the interaction of soluble silicates and chloride and sulphate of magnesia; fourth, the obsolete notion that it was an extruded mud forced outward through the earth's crust.

The important localities in our neighborhood are the serpentine rocks of Syracuse between dolomite beds, those of Pennsylvania and New Jersey, and the

very large development on our own Island continued in the serpentine ledges of Hoboken. Dr. Britton formerly held that these serpentine rocks were mostly or entirely replaced dolomites and later partially altered schists. Dr. Julien advocates the latter view. The sections presented were made from rock taken from an exposure on Little Clove road, and at the head of Bard avenue. They showed the characteristic curdled shreddy and broken appearance of serpentine, and reveal, between crossed Nicol's prisms, luminous colored spots and crystalline fragments of hornblende. There seems left little room for doubt as to the origin of the serpentine in question as coming from hornblende masses, and we may regard the greatest part if not all of our serpentine as a derivative product, resulting from altered crystalline metamorphic rocks, generally referable to the amphibole groups. The variations in different localities of the parent rock can only be determined by such microscopic examination of numerous specimens. The alteration may have begun shortly after the contraction and hardening of the original sediments, or later when these beds were further raised, broken and heated by plication.

Adjournment at ten o'clock.

PROCEEDINGS

— OF THE —

Natural Science Association, OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *June 11th, 1887.*

Meeting called to order at 8.30 o'clock.

Mr. James Raymond chosen secretary *pro tem*, and two new members elected.

An informal report was made by the committee on the forthcoming meeting of the American Association for the Advancement of Science, and it was finally decided to co-operate with the Torrey Botanical Club in the entertainment of the visiting botanists, as the best method of taking part in the proceedings.

Mr. Wm. T. Davis reported the discovery on May 29th, of *Clematis ochroleuca*, growing on a sand dune jutting out in the meadow on the North Shore of the Island, near Old Place Creek. This locality is of quite a different character from the other two stations on Staten Island where this plant has been found, and about five miles distant from the nearest of them. Mr. Arthur Hollick and Mr. Davis had visited the spot week later and made a somewhat careful inspection. Near the knoll, and separated by about one hundred feet of salt meadow, there is quite an extensive growth of *Hudsonia tomentosa*, beautifully in bloom on June 5th, and also a profusion of the trailing blackberry. On the dune proper the vegetation changes slightly—*Lupinus* and *Gaylussacia* growing in great abundance. *Quercus obtusiloba*, *Q. nigra*, *Q. prinus* with var. *humilis* and the Virginia pea are also present. The pink grows with the *Clematis* on Todt hill, and is also a characteristic plant of this locality. The number of plants may be estimated at

about one hundred and occupy but a portion of the knoll.

Dr. Britton said that on Staten Island this plant had been associated heretofore, in the minds of botanists, with the iron ore regions, and that the localities on Todt hill and near Court House station were free from evidences of glaciation. On Todt hill it grows on the yellow drift and outcropping serpentine. The leaves of some of the specimens are slightly cleft, showing in this an approach to the more common leaf form of the genus. This plant was reported years ago from Long Island, and specimens preserved, the labels on which read about one-half a mile from South Ferry, Brooklyn. The localities reported in Pennsylvania and Virginia appear not to be well known, so that the stations given on Staten Island are the only definite ones.

Some discussion on the *ailanthus* elicited the information that dead flies were sometimes found in numbers under its branches, and also that when used as a shade tree it was free from the the nibblings of passing cattle and horses.

Mr. Jas. Raymond gave the red start and warbling vireo as additions to the list of birds known to breed on the Island.

Mr. Arthur Hollick reported *Quercus ilicifolia* growing at Watchogue, being an additional oak for Staten Island.

Dr. Carroll exhibited a calcite crystal containing a small bubble.

Adjournment at 10.15 P. M. to the next regular meeting in September.

PROCEEDINGS

— OF THE —

Natural Science Association, OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *October 8th, 1887.*

Meeting called to order at 8.15 o'clock.

Mr. Arthur Hollick elected Secretary pro tem.

The resignation of Mr. Ernest Congdon, as recording secretary, was read and accepted, and Mr. Geo. Hicks was elected to fill the vacancy.

Dr. A. L. Carroll and Mr. Arthur Hollick exhibited specimens of the material from an artesian well at Bachmann's brewery, Clifton, in which the recent alleged discoveries of gold, copper and rubies were reported. The specimens said to have come from the lowest depth, (about 900 feet), were typical New York Island rock, being a mica schist containing garnets, which were probably mistaken for rubies. In this connection it is of interest to note that Dr. N L Britton predicted the finding of this rock below and to the eastward of our serpentine, in case a sufficient depth was reached — (Annals of the N. Y. Acad. of Sciences, Vol. II, Nos. 5 and 6, April 4, 1881.) The greatest interest was however centered in a specimen of conglomerate, consisting of pieces of wood, mortar and scraps of iron and brass cemented together with sesqui-oxide of iron. It was not stated whether specimens of this material were the ones analyzed, but if they were it would not be difficult to account for the finding of copper, iron and perhaps other metals, as it is evidently the refuse of some metal working establishment and is of recent formation.

Mr. Hollick exhibited drawings of lemon pits, which had germinated while inside the lemon. One had developed two imperfect *green* cotyledones, and had

pushed its way for about $\frac{3}{4}$ in. through the pulp of the fruit.

A skin scraper and several arrow heads, from Old Place, presented by Mr. L. W. Freeman, were shown. Also a skin of the spotted warbler, (*Sylvicola maculosa*), obtained by Mr. R. H. Britton, at New Dorp, on May 7th. The same species had been noted on May 15th in the neighborhood of Eltingville, by Messrs. Wm. T. Davis and Arthur Hollick.

Mr. Jas. Raymond stated that while sailing in a cat boat, near the Long Island shore, a fish hawk lit on the mast head, where it remained some time, but finally flew to the mast of a schooner lying near by. These birds visit Staten Island in early Spring, but are particularly numerous in late Summer and Autumn. They frequent the sea shore and ponds, and many are shot while perching on certain favorite dead trees, eating their prey. So far as known only one pair of these birds has attempted to nest on the Island. The nest was in process of construction on June 14th, 1874, in a partly dead chestnut tree on the meadows near Garretsons, but the birds were frightened away before completing it. If protected from persecution there is apparently no reason why they should not nest here as freely as they do along the coast of New Jersey.

Mr. E. M. Eadie reported the capture of a walking stick insect, (*Diapheromera femorata*), at Old Place. It is of quite rare occurrence, only three other specimens having been collected by members of the Association on Staten Island within the past six years.

Adjournment at 9-30 o'clock.

PROCEEDINGS

— OF THE —

Natural Science Association, OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *November 12th, 1887.*

Meeting called to order at 8.30 o'clock.

Mr. G. W. Wright elected chairman

pro tem.

This being the annual meeting, reports of the officers for the past year were read.

The Treasurer reported an income of \$154.30 and a balance of \$44.20 in the treasury.

The recording secretary reported 44 names on the roll of membership.

The Curator reported twenty-three donations to the cabinet; also, an addition to the library of fifty-six books and pamphlets, and twenty eight numbers of current periodicals received in exchange for the Proceedings.

The following officers were elected for the coming year: President, L. P. Gratacap; Rec. Secretary, Geo J. Hicks; Cor Secretary, Arthur Hollick; Treasurer, Samuel Henshaw; Curator, Wm. T. Davis.

The following committee was appointed to solicit and receive subscriptions for the proposed monument to Audubon, in Trinity cemetery, New York: Arthur Hollick, James Raymond and Wm. T. Davis.

Mr. Arthur Hollick exhibited specimens of pottery and read the following notes upon the same:

Fragments of pottery have been found at nearly every place where other relics of the Indians occur.—Tottenville, Kreischerville, Mariner's Harbor, and lately at the mouth of Fresh Kills, in Westfield, at which locality thus far no other relics of the aborigines have been found, although the remains of shell accumulations are to be seen over quite an extensive area. The material is, of course, far more perishable than that from which the arrow points and other stone implements are made, and it is consequently seldom that anything more than mere fragments are picked up. The clay from which the pottery was made is apparently our boulder or drift clay, as it is impregnated with iron, and bakes to a light yellow brown or gray color. It is invariably mixed with foreign material, either fine sand or pieces of sharp broken stone. The marks of ornamentation are interesting, and their differences are well described under the recognized names of cord and mat marked, corn-cobbed, thumb-nailed, incised and stamped, according to the means employed in making the markings, either by wrapping coarse matting or cord around the utensil while the clay was soft, or else by impressing it with a corn-cob, thumb-nail or some sharp implement. Amongst the specimens which we have

found from time to time all these styles of marking are represented, beside a few in which the ornamentation is raised instead of depressed. The most valuable specimen is a pipe, found at Tottenville, by Mrs. Arthur Hollick, which, for a pipe, is in quite a perfect condition. It is composed of somewhat finer material than the other pieces, and is ornamented with a band of three raised edges encircling the bowl at the top. It is almost symmetrical in shape and the stem is flattened, the cross section being almost an ellipse. Dr. C. C. Abbott, in his "Primitive Industry," speaks as follows in regard to the clay pipes found along the Atlantic seaboard: "Fig. 334 represents a pattern of a small clay pipe, of which fragments are found in abundance, but of which a perfect or nearly perfect example is seldom seen. * * * The clay of which these small pipes are made is of a much finer quality than that used in the ordinary earthenware. * * *" This figure evidently represents a pipe very similar to our Tottenville specimen, and the description of the material composing it agrees also with that of ours. One other piece worth calling particular attention to is a solid lump, shaped something like an animal's head, marked by a few sharp incisions. It is probably an ornament which was broken from some larger article. All the other fragments are more or less curved in outline and are evidently pieces of pots or jars.

The following Indian relics were presented.

Pottery and skin scrapers from Erastina, and hammerstone from West New Brighton, by Jas Raymond. Stone pestle from Mariners' Harbor, from Mr. De Hart. Slate gorget from Old Place, from Mr. Jas. Kenney.

Mr. Hollick showed specimens from the neighborhood of the well at Bachmann's Brewery, Clifton, obtained since the last meeting. The specimens were similar to those already shown and remarked upon. A crucible assay was made of some of the "ore" and a button of metal obtained, which proved to consist of iron, copper and zinc. Another sample of the same material was subjected to an examination with a magnet and microscope, and small lumps of metallic iron and brass were found. No doubt some of the metal in the button was due to the reduction of the sesqui-oxide of iron with which the rock is impregnated, but most of it was from the foreign material which has somehow become mixed with it.

Adjournment at 9.45 o'clock.

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PROCEEDINGS
— OF THE —
Natural Science Association,
OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, December 10th, 1887.

Meeting called to order at 8.20 P.M.
Mr. Samuel Henshaw elected temporary chairman. After the transaction of the usual business, Mr. Wm. T. Davis offered the following notes on native bats:

For several years I have visited, from time to time, a colony of Carolina bats (*Vespertilio fuscus*), inhabiting a barn on the Turnpike road. They have rarely been disturbed, and the man who has charge of the premises says he has seen them every summer for many years. Where they hibernate in Winter time I do not know. I have looked carefully but have not been successful in finding them in the barn, though there are many crevices and spaces between the floors that afford the requisite shelter, and where, perhaps, they have secreted themselves. Mr. Ernest Neilson gave me, several years ago, a male specimen of this species, which had stowed itself away among the wood in the cellar of a stable, and was discovered when some of the fagots were removed on December 21st.

One afternoon, (June 5th), I visited the barn, it being my first introduction to the colony. They were making an incessant clicking sound, for it was getting late, and the time for the first twilight flight approaching. I could see several dark clusters of bats, as large as my head, high up in the rafters, and close to the peak of the roof. It was necessary to disturb them, as I wished a specimen for identification, so I obtained a ladder and a pole. When I touched one of the clusters, the bats, as was to be expected, flew in all directions, some of them getting in beside the ventilator frame for safety, and I then discovered that there were numbers hidden away in such places. I captured one from behind the ventilator frame, and on getting down found another on the floor. This latter individual had two young, which hung fast through all the flapping about of the mother in my efforts to capture her. However, when I found she had young, I let her go, and she crawled away into a crevice.

Bats generally are well able to fly up from the floor when they happen to fall on it, and it was probably the young in this case that prevented the mother from doing so. I have laid a red-bat with outstretched wings on a board, and when released it flew off without any preliminary flapping. Upon arriving home I discovered the specimen I had brought with

with me was also a female, and on dissection found two embryos, whose wings expanded four inches. I think it is likely that the females of this species, when about to have young, or when they are yet very small, hide themselves in a convenient cranny, at least it has been my experience to find them in such places.

Later in the season the young bats, either from inexperience or helplessness, hang up in the day time in various exposed places all over the barn. The old man told me that the dog chained on the ground floor killed some nearly every night, and I picked up one that had lost its life in this way. He also found many of the young on the floor in the morning and threw them out of the window, they flying away after a time.

I disturbed a small cluster of these bats once and a young one fell to the floor, when almost immediately an old bat came close to it and lit on a beam. I suspect it was its mother, but not thinking of it at the time brought the little one away with me. It was fond of milk, but I could not get it to fly, it being younger than I at first suspected. One afternoon, in the hope of getting it to take wing, I put it in a cherry tree, and it climbed to one of the highest branches. About nine o'clock in the evening I heard it chattering, so getting a lantern, I climbed up to see what it was doing, and found that it had come all the way down the tree again to the main trunk.

There is another colony of these bats inhabiting a barn near Richmond, but it is not so large as the one just considered, which probably embraces from seventy-five to one hundred individuals.

The red bat is not social like the species just mentioned, at least I have always found a lone specimen hung upon a bush or tree branch, which, when disturbed, even in daylight, flew very well to another location of the same sort. Indeed, I have seen this bat abroad in the day time, particularly in the fall of the year. On the 26th of last November I saw a bat flying in the brightest of sun-shine, at 1.50 P.M., but was unable to approach sufficiently near to identify the species. It flew up and down a small field, making many sudden turns, and was catching insects, which were plentiful, it being a warm afternoon.

The little brown, silvery-black, Carolina, red and hoary bat are the species so far found on the Island; one or two of them, no doubt, being migratory.

Adjournment at 9.35 o'clock.

Proceedings of the Natural Science Association, OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, January 14th, 1888.

Meeting called to order at 8 30 o'clock.

The following notes on the Modified Drift, by Dr. N. L. Britton, were read:

As is well known, there is a nearly level tract of country, several square miles in extent, in the town of Southfield. Its boundaries may be roughly defined as follows: To the northeast it is bordered by the hills which cross the Bay at the Narrows; to the west and northwest by Todt Hill; to the southwest by the higher ground between Court House Station and the Great Kills, and to the east and southeast by the Lower Bay. About one-half of the area thus enclosed is occupied by salt meadows and one-half by upland, which, at New Dorp, extends to the water's edge. As there are no roads, or railroad cuttings through this plain its geological structure has always been obscure, though I have supposed it was composed of modified drift, and have published this opinion. This it will be remembered differs from the Glacial or Moraine Drift in being stratified. The materials composing it—gravel, sand, loam and clay—being arranged in layers one above the other, deposited from the sea at a time when the land stood lower than it does now and all the area of the plain was submerged. I had actually seen the structure at one point only, where a well had been sunk to a depth of some thirteen feet, displaying the stratification. Interesting confirmation of my opinion has now been furnished by the excavation of a ditch, over half a mile long, on the property of Mr. George Vanderbilt, at New Dorp. This was dug to drain a pond, and reached a depth at places of over ten feet. The Modified Drift was seen along its whole line, consisting of alternating layers of gravel, sand, loam and clay.

An unexpected feature of the gravel thrown-out was the abundance of Serpentine pebbles. This rock forms the high ridge of hills of the central part of the Island, but is peculiarly scarce in the Glacial Drift, even in that portion of it which must have been transported directly across the ridge. This circumstance has long been the subject of remark by members of the Association. In the Modified Drift, as revealed in these recent excavations, the Serpentine pebbles form a very appreciable part of the gravel, reaching a maximum diameter of six inches, and like all the other kinds of rock represented were rounded and water-worn. The Yellow or Pre Glacial Drift was not reached in the diggings; its position is under the Glacial and Modified drifts and over the white, cretaceous clays. These doubtless underlie the whole plain at a greater depth, as I have formerly pointed out.

Mr. Sanderson Smith gave an account

of the distribution of the salt water fauna along our coast, illustrated by charts showing the location of nearly all the dredging stations from which specimens have been obtained. A single specimen of *Littorina littoria* was shown, which had been picked up on the Staten Island shore at the Narrows by Mr. Hollick, and the following memoranda on the species were given by Mr. Smith:

This shell, called in England the "Periwinkle," and largely consumed in Northern Europe as an article of food, is apparently of very recent introduction on the American Continent, but within the last sixteen years has made its way along our coast with extraordinary rapidity. Prof. Willis first announced its presence, at Halifax, in 1857, although Dr. Dawson is said to have found it at Pictou, Nova Scotia, as early as 1840. I found it abundant on Cape Breton Island, about 1868 and Mr. Whiteaves on Prince Edwards Island in 1873. The U S Fish Commission found a few specimens at Portland, Me., in 1871; Mr. Blake a few at Provincetown, Cape Cod, 1875; two specimens were found at Wood's Holl, Mass., also in 1875. Soon after it was found at Newport, R. I. At all these places it is now one of the most abundant shells, almost displacing the native species of *Littorina*. At New Haven Prof. S. I. Smith found it in 1879-80; at Lloyds Neck, Long Island, Mr. Henry Prime found it in 1881, and now it turns up still further South, on Staten Island. It is likely enough that its progress will now be slower, as the almost exclusively sandy shores to the south of us, with no rocks and but few pebbles, are not well adapted to its habits. It seems difficult to understand why a shell which has shown such extraordinary capacities for rapid distribution should have required so long a period to spread from Halifax to Portland, and previously from Pictou to Halifax. The original manner of its introduction is obscure, but it was most probably brought over by French or British fishermen as food. The common garden snail of Northern Europe (*Helix hortensis*), offers a curious contrast in respect to rapidity of distribution. Though first known in America many years ago it is still almost confined to a few islands off the coast of Massachusetts, although a few have been found at Astoria, Long Island, and Burlington, N. J. Singularly enough it is very abundant on the almost uninhabited island of Anticosti.

Mr. E. M. Eadie presented a drift pebble from Old Place containing *Orthis testudinaria*. Mr. Gratacap remarked that he had identified another drift fossil, new to the Island, and not included in the list, *Helicotoma uniaugulata*, also found by Mr. Eadie near Old Place.

Adjournment at 10.30 o'clock

PROCEEDINGS

— OF THE —

Natural Science Association,

OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *February* 11th, 1888.

Meeting called to order at 8.20 o'clock.

On motion of Mr. Hollick the following preamble and resolutions were adopted:

Whereas, Our attention has been called to the title of a bill recently introduced in the Assembly, designed to allow the shooting of robins on Long and Staten Islands during the month of October, and

Whereas, Such legislation would be a gross injustice to our Island, and would be a source of needless cruelty and destruction to our birds.

Resolved, That the Natural Science Association of Staten Island earnestly protests against the passage of this or any similar legislation, which tends to convert our Island into a legal shooting ground for the idle persons of New York and vicinity; and,

Resolved, That copies of this preamble and resolutions be transmitted to the newspapers of the county and to our representatives in the Legislature, with the request that they use their best efforts to defeat the bill in question.

Mr. L. P. Gratacap made the following remarks upon the "boiling springs:"

During the very cold weather which visited us in January, culminating on January 27, and lowering the average night temperature to within a few degrees of zero, while the thermometer registered 12°-15° F. as its maximum in the day, the temperature of a group of springs on the hillside, south of Castleton avenue and near Bement, was taken. They were found to range from 44° to 53° F., the colder water being due to a less rapid flow and consequently longer exposure at the springs' vent to the atmospheric influence. These springs, known as the "Boiling Springs," doubtless arise from below the impervious beds of clay, which may be seen outcropping along the sides of the gulches in the neighborhood washed out by freshets. While it seems unlikely that they issue from such a depth as 60 or 80 feet, which is assigned by Guyot as the

limits of the zone of invariable temperature at our latitude, it is quite certain that their points of origin are deep seated and almost, if not entirely, removed from superficial influences. The observation of Mr. W. T. Davis upon the Summer temperature of the Clove Valley springs corroborates this. He found that to be from 53° to 54°; almost identical with the Winter temperature of these springs at the coldest period of the season. The water flowing with this elevated temperature nourished an abundant growth of the common fresh water alga (*Conferva vulgaris* Rab.) which in turn supported in its thick and confused clusters numerous diatoms and infusoriæ. The green stems of a species of *Veronica*, too immature for determination, flourished abundantly in the tepid rivulet escaping from the tiny pools, while within a few feet last Summer's grasses were frozen in a crust of ice.

Mr. Wm. T. Davis read a portion of a letter from Mr. Aug. R. Grote. The extract is as follows: "Two items occur to me which may interest the Scientific Association. In 1856 I found *Clematis ochroleuca* growing on Kellett's Hill, near Egbertville, on the Southern slope near the top. My specimens went to the late Hon. Geo. W. Clinton, botanist, of Albany. I also collected a specimen of the fork-tailed flycatcher, *Milvulus tyrannus*, near our farm of Hill Park, towards the south-west side of the Island. The specimen was easily observed and followed from its flight and its elongate forked tail. It was not difficult to shoot. I believe all the skins I then collected, about 1856, were afterwards destroyed from imperfect poisoning."

Adjournment at ten o'clock.

PROCEEDINGS

— OF THE —

Natural Science Association, OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *March 10th, 1888.*

A quorum for the transaction of business not being present, an informal meeting only was held.

Mr. Arthur Hollick read the following notes, illustrated by drawings and dried specimens:

During the Autumn of 1881 a species of sedge was found in company with *Callitriche verna* and *Dichelyma capillaceum* growing on the bottom of one of the springs near the present site of the S. I. Water Supply Co. It was prolific, and showed no signs of either perfect flower or fruit, but as it was rather late in the season a more favorable time was awaited in which to collect and study it. The spring was deep, with walled sides and a clean sandy bottom and was never known to freeze, even in the severest winter. The plant was entirely aquatic—no part of it ever growing to the surface of the water. During the succeeding year it was visited from time to time in the hopes of obtaining either the flower or fruit, but without success. Specimens were however collected with aborted prolific spikes, and it was finally admitted provisionally by Dr. Britton and myself into the Flora of Richmond Co., in the appendix for 1883-84, under the name *Eleocharis prolifera*, Torr. (?). Since then it has been kept under constant scrutiny, but has never been found with flowers, and we were forced to conclude that it did not produce any. It was naturally with some trepidation that it was determined to be this plant, as its habitat is given by Chapman, in his "Flora of the Southern States," to be from Florida to N. Carolina, and from there to Staten Island seemed a very extensive jump for the plant to take, without any intermediate locality from which it could have spread. Within the past six weeks, however, we have received specimens from the neighborhood of Trenton, N. J., which is a little more encouraging. It is well also to bear in mind that the place which this southern plant secured for its home so far north is just such a one as we would expect, namely, a perennial spring, which never freezes and in fact which maintains a constant temperature throughout the year of about 53°. So far as known, it failed to secure a foothold at any other locality on the Island, and the specimens which are now in our herbaria are probably the only ones which will ever be seen from here, as the spring has become silted up and all signs of life obliterated.

I was interested to find the following note in Dr. Torrey's monograph on the Cyperaceæ of N. America, p. 315-16:

"Among my undetermined Cyperaceæ is a species of *Eleocharis* from the Southern States, which I have never been able to obtain with mature fruit. * * * *

The spike is ovate and compressed, but instead of producing flowers it throws out a tuft of long filiform peduncles or rather culms, one from the axil of each scale, which strike root into the mud or float on the surface of the water and likewise bear prolific spikes. * * * * I am inclined to consider this species as distinct from any other described in this monograph. It may be distinguished by the name of *E. prolifera*."

Again, in the Columbia College Herbarium, accompanying a specimen labeled *E. prolifera*, is a note by Dr. Torrey, which reads: "This may be a state of my *Chaetocyperus Baldwinii* and the plant referred to in Baldwin's notes. * *

Careful comparisons have been made between our specimens and those in the Columbia College Herbarium, under the names *Eleocharis Baldwinii*, Torr. and *H. prolifera*, Torr. but our material is too imperfect to definitely determine just where it belongs. The specimens, while showing the general characteristics of the above-mentioned species differ in having a stiff jointed woody rachis, along which the spikes are arranged alternately, and at the summit of which they are closely appressed into a somewhat imbricated cluster. Several of the plants have also produced runners or stolons which bear the prolific spikes at irregular intervals. It is greatly to be desired that a perfect spike, either in flower or fruit, may be obtained, as the species could then be determined without doubt. It is possible that a more careful search of some of our less frequented springs may bring some more specimens to light, and in the meantime it will have to be known in our local flora under the provisional name that was first given to it.

Mr L. P. Gratacap presented a nest of the Baltimore Oriole, suspended from the branches of a cherry tree. One side of the nest had been supported by means of strands of worsted attached to a branch considerably above the main support, acting in the nature of a guy rope to steady the structure.

A fasciated branch of a maple, collected by Mr. H. R. Wemple, was shown, which measured $\frac{3}{4}$ in. in diameter at the point where it was broken from the tree. The branch was divided—the fasciated forks, measuring $\frac{3}{4}$ in. and $1\frac{1}{4}$ in. in breadth respectively.

Apr 14, 1888

PROCEEDINGS
— OF THE —
Natural Science Association,
OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *April 14th*, 1888.

Meeting called to order at 8.30 o'clock.

Mr. Chas. W. Leng presented a list of the Water Beetles of the Island which will be published as an extra, and read the following paper upon the same:

One of the most interesting groups of Coleoptera contains the Water Beetles. They are divided into several families in the classification, according to their structure, but all agree in living exclusively in water, even passing through their transformations beneath its surface. Their first aspect is immediately suggestive of their habit of life. The shape is boat like, enabling them to glide easily through the water, and the smooth glistening surface offers as little resistance as possible. A closer examination reveals yet more particular adaptation to their condition in life. The front and middle legs are short and tuck away snugly into the body. The hind legs on the contrary are greatly prolonged, and changed from the form usually found in running or climbing insects. The tarsi are enormously wide, taking a paddle form. They are thus enabled to propel themselves through the water with powerful strokes, the muscles which control their movements being greatly developed. These parts reach their highest development in the large *Dytiscidae*, and the rapidity with which they move is astonishing. The resistance which any insect makes to captivity is good evidence of the strength of which it is possessed, and in these large Water Beetles it is really an exertion to hold the struggling creature.

Besides the legs other parts show an exact adaptation to a watery existence. The eyes are prominent and set well forward; the antennae and palpi divested of all ornamentation, and fitted closely to the head. The under surface, protecting the vital organs, is either covered with horny plates, closely fitting, or with a fine pubescence.

The difference between the sexes is in some species not conspicuous, in others very marked. The males in such species have the front tarsi widened, until they present a circular sucker-like appearance, while the females often have the elytra deeply grooved or finely transversely striate.

The species found on Staten Island are many in number, and some are of large size and striking appearance, and are to be found abundantly in our ponds. It might be a matter of surprise that they receive so little general attention, if their retiring habits were left out of consideration. They, for the most part, spend their lives in the muck at the pond bottom, performing the humble offices of scavengers. A few frequent the surface of ponds and running brooks, and these comprise the family *Gyrinidae*, or Whirligigs. They are often seen in large schools, darting hither and thither in the sunlight, and whirling about with a rotary motion peculiar to them. When alarmed they exude a milky fluid, said to possess the odor of apples, which, however, my personal nostrils have never been able to detect.

The *Dytiscidae* come occasionally to the surface, but in a suspicious manner, bolding themselves ready to dive down again at the first alarm. If undisturbed, however, they will remain for a long time perfectly motionless.

The *Hydrophilidae* come to the surface still more rarely, but some may be seen at all seasons swimming leisurely beneath it. The species of *Hydrochus* which are placed in this family in the classification do not, however, swim, and possess little in appearance to connect them with other Water Beetles. They have no power to dive either, and if the mud in which they live is vigorously stirred they float to the top and remain there until they drift against some grass stalk, by which they can crawl

down again. Their pearly luster is remarkable, and it only shows when the creature dries out

The *Elmidae*, of which but few species have thus far been found on Staten Island, have similar habits to *Hydrochus*, but differ in attaching themselves to sticks under water.

Although these insects live so much in water, they still retain the power of flight, but exercise it rarely. I have never seen them fly, but have found them in little rain pools, which they could have reached in no other way. They have also been found on greenhouse roofs, having apparently mistaken the glass for water. It is supposed that their flight is in the night usually, but Mr. J. B. Smith tells of catching *Gyrinidae* while boating, throwing them into the bottom of his boat, only to see them spread their wings and fly over the side.

I have spoken above of the transformations taking place under water, and I may add that the changes are as complete as in butterflies, though far less is known of the particulars.

The female lays eggs, which hatch into wormlike larvae. These eat and grow, and finally become pupae, from which, after a period of rest, the full grown beetle emerges. Difference of size in beetles is not indicative of age, but of a difference in species, or the feeding afforded the larvae. These larvae are in the main scavengers, consuming decaying vegetable and animal matter. Some of the larger *Dytiscid* larvae kill other water insects.

Water Beetles are easily captured in large numbers. The apparatus is a net, through which the water will pass say of cheese cloth or similar material. Ponds with muddy bottoms and plenty of grasses and weeds yield the best variety, and most of my specimens have come from Silver Lake, Grassmere and the Four Corners Iron Mines. The different species are very local, and some do not seem to extend beyond one pond.

The following paper upon the storm of March 12th and 13th was compiled from memoranda contributed by the members present:

The storm was undoubtedly the most severe that had visited the vicinity in the

memory of the present generation. The following records were taken at the Central Park observatory by Prof. Daniel Draper: The lowest temperature reached was 6 above zero; 21 inches of snow fell; the velocity of the wind was about 40 miles per hour, although several gusts greatly exceeded this. At 2.15 P.M., March 12th, it reached a pressure of 36 1/4 lbs to the square foot, which is equal to a horizontal movement of 85 miles per hour; at 2.46 it was 84 miles per hour, and at 4.20 it was 83 3-10 miles per hour. Large drifts formed in many favorable locations, a few of which exceeded six feet in height. One of these formed in the Serpentine Road, near its junction with the Clove, where a lamp post was completely buried. There was also a very large one on the Todt Hill Road, which rendered it almost impassable on the 30th of March. On the 14th of April the remains of many of the drifts were yet to be seen, although the bulk of the snow had disappeared. During the last hours of the storm the melting snow and sleet froze to the tree branches, causing many to break. It was specially disastrous to the evergreens. Pieces of the foliage of cedars, about an inch in length, fell off in vast quantity, so that afterwards there was a thick mat-like accumulation under the trees.

The destruction to bird life must have been very great, not only from the low temperature, but also from the force of the wind. English sparrows seemed to be the most numerous victims, and were reported dead everywhere. They were driven into all kinds of places for shelter in one case even roosting on the ground in numbers under the low floor of an extension, where they were exposed to the attack of cats and rats with hardly a chance for escape and where persons were constantly walking on the floor immediately over them.

The following native birds were also found dead: Robin, Red-winged Blackbird, Gold Finch, Tree Sparrow, Song Sparrow and Snow Bunting. Several were injured by being dashed against something—the robin having a broken wing and the song sparrow and snow bunting having broken beaks.

Adjournment at 10 o'clock.

PROCEEDINGS

— OF THE —

Natural Science Association, OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, May 12th, 1888.

A quorum not being present an informal meeting only was held.

Mr. Wm. T. Davis read the following entomological notes of local interest. A very small straw colored cricket was discovered last August on the borders of the salt meadow at Great Kill. It was chiefly observed on the stems and leaves of the "high tide bushes," (*Ioa frutescens*), and was difficult to capture owing to its shyness. When stridulating the sound produced was quite metallic in tone and may be likened to that well known silvery sound of oxygen escaping bubble by bubble in a water bottle. This insect has been indentified as *Anaxipha exigua*, Say., and seems to have never been reported before from north of Maryland.

The "earwig," (*Anisolabris maritima*), common several years ago on the shore at Camp Washington, before the advent of the railroad, as noted in the proceedings for January, 1887, was discovered the past Summer at the other end of the Island, on the shore at Tottenville. They live under stones and pieces of wood just at high water mark. On an open sandy spot near Tottenville a species of "tiger beetle," (*Cicindela modesta*), has been observed for the past several years, and last Fall a few specimens were seen at Watchogue. These insects have been searched for at intervening points, where the same natural features are present, but have only been discovered at those mentioned,

A specimen of *Erebus odora*, the largest species of noctuid moth to be found on

the Island, was presented to the Association. It was taken during last September while flying about a room, at New Dorp, by Miss M. Britton, and is in good condition. Two other specimens have been captured on the Island during the last few years in the month of July, one at "sugar" and the other in a barn. All of these moths are females, as indicated by the three frenula.

Mr. Samuel Henshaw reported the discovery of a wild rabbit's nest in a small pile of tobacco stems thrown out of a grape house. Its position was extremely exposed, the ground being perfectly bare of shubbery, and workmen constantly employed near it during the day. The nest was small, about the size of an ordinary coconut and lined throughout with fur. It was visited by the mother at night only, who, when about to leave, concealed her four young by drawing the stems carefully over them. When the little rabbits were inspected at evening they uttered a faint cry, and if the hand was placed over them their heads bumped with much regularity against it, supposing no doubt that their mother had come to visit them. These inspections by curious visitors, and the danger from the family dog and cats that were constantly prowling about caused the nest to be deserted and the young died when about two weeks old. The strong odor from the tobacco stems would greatly aid in protecting the nest from predatory prowlers, and it was suggested that the situation may have been chosen for this reason.

PROCEEDINGS
— OF THE —
Natural Science Association,
OF STATEN ISLAND.

SPECIAL No. 7.

VILLAGE HALL, NEW BRIGHTON, *May*, 1888.

PRELIMINARY LIST OF THE LOWER CRUSTACEA OF
STATEN ISLAND.

BY ERNEST A. CONGDON.

I. SUB-CLASS CIRRIPIEDIA.

ORDER THORACICA

Balanus eburneus, Gould.
Balanus balanoides, Stimpson.
Lepas anserifera, L.

II. SUB-CLASS ENTOMOSTRACA.

ORDER COPEPODA.

Cyclops ater, Herrick.
Cyclops diaphanus, Fischer.
Cyclops fimbriatus, Fischer; (*C. crassicornis*, Sars).
Cyclops fluviatilis, Herrick.
Cyclops Lubbockii, (*C. insignis*, Brady).
Cyclops serrulatus, Fischer.
Cyclops tenuicornis, Claus.
Cyclops viridis, Jurine, (*C. ingens*, Herrick).
Canthocamptus crassus, Sars.
Canthocamptus brevipes, Sars.
Canthocamptus minutus, Mueller.
Canthocamptus palustris, Brady.
Canthocamptus Illinoisensis, Forbes.
Canthocamptus Northumbicus, Brady, var. *Americanus*, Herrick.

ORDER OSTRACODA.

Cypris fusca, Straus.
Cypris neglecta, Herrick.
Cypris tristriata, Baird.

Cypris vidua, Mueller.
Candona elongata, Herrick.
Candona ornata, Herrick.
Cythere — ?

ORDER CLADOCERA.

Daphnia pulex, Mueller.
Daphnia vetula, Mueller.
Daphnia reticulata, Baird.
Ceriodaphnia Alabamensis, Herrick.
Ceriodaphnia scitula, Herrick.
Sida crystallina, Mueller.
Scapholeberis angulata, Herrick.
Scapholeberis mucronata, Mueller.
Leydigia quadrangularia, Leydig.
Lynceus sphaericus, Mueller.
Lynceus quadrangularis, Mueller.
Lynceus — ?
Bosmina — ?
Alona glacialis, Birge.
Alona modesta, Herrick.
Alona tuberculata, Kurtz.
Pleuroxus denticulatus, Birge.
Pleuroxus trigonellus, Mueller.
Chydorus globosus, Baird.
Chydorus sphaericus, Mueller.

ORDER PHYLLOPODA.

Branchipus vernalis, Verrill

June 9 1871

PROCEEDINGS
— OF THE —
Natural Science Association,
OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *June 9th*, 1888.

Meeting called to order at 8.30 o'clock

Mr. Samuel Henshaw submitted the following notes: The late spring of this year prevented the buds of the forest trees unfolding at their usual time, but when they did begin, their growth was astonishingly rapid. The horse chestnuts had finished their year's growth in nine days, the beech in about ten days, and other trees correspondingly rapid, as if nature was trying to make up for the delay. Indeed, I have noticed that no matter whether it is an early or late spring, by the first week in June all seasons are nearly alike.

The blizzard played queer freaks with the hardy trees; some Japanese maples, that have stood the last twelve years without any protection, have suffered—one is dead and the others have lost a few of their branches. Some of the hardy cypresses have lost all their leaves, and all the tall Lombardy poplars look in a very dilapidated condition, their long slender branches having been whipped by the strong winds, thereby rubbing off the latent buds. Some trees look as if the bark on the windward side had been polished, so great was the force of the beating with ice and snow.

A second wild rabbits nest was found in a strawberry patch, near the one spoken of in the proceedings for last month, and I think it belonged to the same pair. The young were protected by a covering of soft down and there was no evidence that the mother visited them in the daytime. They remained in the nest until their eyes had been open several days, and by that time they were very active and I believe all got safely away, except one which was

found dead some distance from the nest. The old rabbit spent most of the day under a wood pile about one hundred yards from the nest.

Mr. Sanderson Smith gave an account of *Limax maxima*, which had accidentally been omitted when preparing the recently published list of the Mollusca of the Island. The species is an introduced one, and was found some years ago by Mr. Powell at New Port. Mr. Prime and Mr. Smith had discovered it in a cellar in 14th street, N. Y., and at York, Penn., it had been observed feeding on potatoes. It has been found in numbers in cellars and cisterns on Staten Island.

Mr. Arthur Hollick gave a brief account of the plants which have been found growing independent of cultivation on Staten Island, of which the following is an abstract:

Although the plants of the Island were catalogued in 1879, and four appendices subsequently issued, yet there are many facts to be gleaned from these lists which are not generally appreciated and are of considerable interest. Thus, there are 1,264 species and varieties enumerated, all of which are in our herbarium, with the exception of about 30, which have not yet been collected, although reported upon good authority. These species are distributed among 511 genera and 111 families. 1225 are Phanerogams or flowering plants and 39 are the higher Cryptogams—ferns and their allies. The Angiosperms number 916, of which 377 are Polypetalous, 405 are Gamopetalous and 134 are Apetalous. The Gymnosperms number 6. The Dicotyledones number 916 and the Monocotyledones 303.

If they are divided roughly into herbs, shrubs and trees we have 1,095 herbs, 88 shrubs and 72 trees. Considering them as native and introduced the numbers are about 1039 native and 225 introduced. The largest family is Compositæ, with its 51 genera and 148 species. These latter include 27 Asters and 19 Golden-rods. Grasses—43 genera and 115 species, including 19 Panicums. Cyperacæ or sedges—10 genera and 81 species, including 43 Carex. Leguminosæ—21 genera and 54 species. Labiatæ—25 genera and 48 species. Rosacæ—13 genera and 47 species. Caryophyllæ—15 genera and 38 species. Scrophularinæ—13 genera and 32 species. Ericacæ—15 genera and 31 species, including 11 which are picked under the common name of "Huckleberry." Cruciferæ—14 genera and 31 species. Ranunculacæ—13 genera and 31 species. Polygonacæ—3 genera and 27 species, including 19 Polygonums. Liliacæ—16 genera and 25 species. Orchidacæ—12 genera and 24 species. Umbelliferæ—17 genera and 22 species. In the Ferns we have 13 genera and 28 species. There are 12 Violets, 12 Oaks, 11 Willows, 5 Hickories and 4 Pines. Amongst the large number of plants worthy of particular mention is the *Clematis ochroleuca*, Ait., of which an account was given in the proceedings for June 11th, 1887. The "Crane fly Orchis," (*Tipularia discolor*, Nutt.), although accounted a very scarce plant, is abundant throughout nearly all our deep wet woods. Almost without exception all the most troublesome weeds have been introduced, such as the "Pig weeds," "Wormseeds," "Amaranth," "Crab grass," "Wild Carrot," "Ox eye

Daisy" &c. Some of the worst weeds have spread so rapidly in recent years that although they are already pests yet no common name has been invented for them. For instance I can well remember when the first few plants of *Galinsoga parviflora*, Cav., made their appearance in this region. It is now to be found nearly everywhere at this end of the Island and is spreading with amazing rapidity. "Trailing arbutus" has almost become a thing of the past, although a few patches still exist, which have not yet been destroyed by "arbutus parties." General memoranda upon our flora will be found in the proceedings for June 13th, 1885, and an account of our forest growth and the few large trees yet remaining, in the proceedings for Feb. 12th, and Mch. 12th, 1887. Memoranda have been accumulating since the 4th appendix to the flora was issued, which will probably necessitate a fifth appendix at the end of the present season, so that it will be seen that the work of the botanical collector on Staten Island is not by any means completed, especially when it is remembered that most of the lower orders of cryptogams have hardly been touched. The Diatoms are however being catalogued by Mr. E. A. Schultze, and a list of the sea weeds by Mr. Nicholas Pike, is ready for the printer, while a good preliminary list of the mosses is in preparation; but the Liverworts, Lichens, Desmids, Fungi and Protophytes await the future botanist's attention.

A contribution of fresh flowers was made by Mr. Samuel Henshaw, which were distributed to the members at the close of the meeting.

Adjournment at 10 o'clock.



PROCEEDINGS

— OF THE —

Natural Science Association, OF STATEN ISLAND.

SPECIAL No. 3.

VILLAGE HALL, NEW BRIGHTON, June, 1888.

PRELIMINARY LIST OF WATER BEETLES OF STATEN ISLAND.

BY CHARLES W. LENG.

The Species, whose names follow, I have myself collected on Staten Island, or have the authority of the Collector, whose name is given, for inserting it. I shall be very much obliged for any additions to the list.

HALIPLIDÆ.

- Haliphus fasciatus*, Aube.
- " *ruscolpis*, De G.
- " *triopis*, Say.
- " *punctatus*, Aube, (M. L. Linell).
- Cnemidotus 12-punctatus*, Say.
- " *edentulus*, Lec.

DYTISCIDÆ.

- Canthyrus bicolor*, Say, (Mr. Linell).
- Hydrocanthus tricolor*, Say.
- Laccophilus maculosus*, Germ.
- " *fasciatus*, Aube.
- " *undatus*, Lec.
- Hydrovatus cuspidatus*, Germ.
- Desmopachria convexa*, Aube.
- Bidessus affinis*, Say.
- " *granarius*, Aube, (Mr. Linell).
- Celina angustata*, Aube, (Mr. Linell).
- Cœlamбус inæqualis*, Fab.
- " *nubilus*, Lec.
- " *torbidus*, Lec, (Mr. Linell).
- " *impressopunctatus* Sch., (Mr. Linell).
- Deronectes griseostriatus*, DeG. (Mr. Linell).
- Hydroporus concinnus*, Lec.
- " *undulatus*, Say.
- " *striatopunctatus* Mels.
- " *modestus*, Aube.
- Ilybius biguttatus*, Germ.
- " *ater*, DeG.
- Coptotomus interrogatus*, Fab.
- Copelatus glyphicus*, Chev.
- Matus bicarinatus*, Say.
- Agabus parallelus*, Lec.
- " *obtusatus*, Say.
- " *disintegratus*, Cr.
- " *tæniolatus*, Harr, (Mr. Linell).
- " *gagates* Aube, (Mr. Linell).
- " *erythropterus*, Say.
- Rhantus calidus*, Fab.
- " *binotatus*, Harr, (Mr. Linell).
- Colymbetes sculptilis*, Harr, (Mr. Linell).
- Hydaticus stagnalis*, Fab.
- " *piceus*, Lec. (Mr. Linell).
- " *bimarginatus*, Say. (Mr. Linell)
- Dytiscus fasciventris*, Say.

- Dytiscus hybridus*, Aube.
- " *verticalis*, Say.
- Cybister ambriolatus*, Say.
- Acilius semisulcatus*, Aube.
- " *fraternus*, Harr.
- " *mediatus*, Say.
- Thermonectes basilaris*, Say.
- Graphoderes liberus*, Say
- " *fasciaticollis*, Harr, (Mr. Linell).

GYRINIDÆ.

- Gyrinus ven tralis*, Kirby.
- " *affinis*, Aube, (Mr. Linell).
- " *ansæ*, Say, (Mr. Linell).
- " *borealis*, Aube, (Mr. Linell).
- Dineutes vittatus*, Germ.
- " *discolor*, Aube.
- " *assimilis*, Aube.

HYDROPHILIDÆ.

- Helophorus lineatus*, Say, (Mr. Linell).
- Hydrochus scabratus*, Muls.
- " *subcupreus*, Rand.
- " *inæqualis*, Lec, (Mr. Linell).
- Hydraena pennsylvanica*, Kies, (Mr. Julech).
- Hydrophilus triangularis*, Say.
- " *ovatus*, G. and H., (W. T. Davis).
- " *nimbatus*, Say.
- " *glaber*, Hbst.
- Hydrocharis obtusatus*, Say.
- Berosus peregrinus*, Hbst.
- " *striatus*, Say.
- Laccobius agilis*, Rand.
- Philhydrus nebulosus*, Say.
- " *cinctus*, Say.
- " *diffusus*, Lec.
- " *fuscus*, Mots.
- " *ambriatus*, Mels.
- " *lacustris*, Lec.
- " *reflexipennis*, Zimm., (Mr. Linell.)
- " *bifidus*, Lec., (Mr. Linell).
- " *ochraceus*, Mels., (Mr. Linell)
- Hydrobius globosus*, Say.
- " *subcupreus*, Say., (Mr. Linell).
- Cereyon pygmaeum*, Ill.
- " *prætestatum*, Say., (Mr. Linell)

PROCEEDINGS

— OF THE —

Natural Science Association of Staten Island.

VILLAGE HALL, NEW BRIGHTON, Sept. 8th, 1888.

Informal meeting.

Mr. Wm. T. Davis exhibited specimen branches of Bartram's Oak, (*Quercus heterophylla*, Michx.) which he had found on the Island, and remarked as follows upon the trees and the locality:

Between Richmond Valley and Tottenville and to the south of the railroad track there is a low, wet piece of woodland where the only willow oaks known to grow on the Island occur. The majority of the trees are in two groups, though sparingly represented throughout the small patch of woods, and the hybrid *heterophylla* is about as numerous as the species *Phellos*. The leaves exhibit all modifications, many being deeply lobed on one side and smooth willow oak-like on the other. On some of the trees the leaves show scarcely any departure from the normal willow oak form except in the greatly increased size.

Though Bartram's Oak has been considered both as a species and as a variety or hybrid, yet every circumstance in this case seems to prove the truth of the latter conclusion. Many of the trees observed show the characteristic branching of the swamp oak, which was undoubtedly most often one of the parents, though it is also evident that some of the other members of the red oak group have acted in this capacity.

Some of the hybrids bear acorns, and it is possible that the considerable number of trees with large leaves, in shape like those of the willow oak, may have been produced in this way and are reverting to the normal *Phellos*.

Mr. Hollick showed a series of hybrid oaks collected at the same locality and read the following paper upon the same:

One day during the past Summer Mr. Davis brought me some leaves of an oak which he had found growing at Tottenville. To my surprise and delight I recognized them as belonging to the Bartram Oak", (*Quercus heterophylla*, Michx.) On Sep. 2nd we visited the locality and found not only typical *heterophylla* but also a number of other peculiar trees—evidently hybrids between *Quercus Phellos*, the Willow Oak, and some one or more of its neighbors, *Q. tinctoria*, the Yellow or Black Oak, *Q. palustris*, the Swamp Oak, *Q. coccinea*, the Red Oak, and *Q. nigra*, the Black Jack Oak. All the trees grow within a very limited area, perhaps half an acre in extent, in a patch of wet sandy woodland. There are about twenty of these hybrids, some of them young saplings and others large trees 40 or 50 feet in height. They show every gradation in leaf form from the narrow, entire, typical *Phellos*, to

lobed or pinnatifid and broad ones like *tinctoria*, *coccinea*, *palustris* and *nigra*. Not only do leaves collected from different trees show the gradual change from one species to another, but in some instances similar series of leaf forms may be collected from a single tree. One of the hybrids is undoubtedly *Q. nigra* x *Q. Phellos*, which has already been described as a species (*Q. Rudkini*, Britton), founded upon specimens from Keyport, N. J., (See Bulletin of the Torrey Botanical Club, Vol. IX, No. 2.) The origin of the other hybrids is more difficult to determine, as they apparently fruit very sparingly—one large tree, which I climbed for the purpose and thoroughly searched, not yielding a single acorn. *Q. Phellos* is one of the parents in each case, beyond doubt, and for the other we must look to *tinctoria*, *coccinea* or *palustris*. Careful study of the fruit will be necessary in order to determine this with any degree of satisfaction. In characterizing these trees as hybrids I do not mean to except the typical *heterophylla*, as it occurs here merely as one of the members of the series. The most significant fact in regard to these hybrids is that they occur strictly within the limits of the area where *Q. Phellos* grows,—the trees being apparently inseparable. (This latter species, until the present Summer, was thought to be represented on Staten Island by a single tree, which was found close to this locality in 1879. We however found quite a number, in almost every stage of growth—one tree in particular being about fifty feet in height and 3 ¾ feet in circumference.)

The discovery of these hybrids on Staten Island is a matter of great interest, as it adds two recognized species to our local flora and to the State, and, so far as I am aware, locates *Q. heterophylla* about thirty miles north of its nearest previously known locality. It is another example of the exceedingly interesting flora which the little piece of Pine Barren territory at Tottenville has yielded us. In view of these facts I have thought that perhaps a brief review of some of the literature on the subject might be of interest.

The earliest published description of *Q. heterophylla* is to be found in Michaux's "North American Sylva," published about the year 1810. This description, illustrated, was founded upon a single tree, growing on the farm of John Bartram, near Philadelphia, where it had been known and recognized as a peculiar tree, certainly as far back as 1750. He says: "Every botanist who has visited different regions of the globe must have remarked

certain species of vegetables which are so little multiplied that they seem likely at no distant period to disappear from the earth. To this class belongs the "Bartram Oak." Several English and American naturalists, who, like my father and myself, have spent years in exploring the United States, and have obligingly communicated to us the result of their observations, have, like us, found no traces of this species except a single stock in a field belonging to Mr. Bartram, on the banks of the Schuylkill, four miles from Philadelphia." Frederick Pursh, in 1814, describes the same tree. W. P. C. Barton, in his "Floræ Philadelphicæ," published in 1818 refers to it as "the only individual of this species known." Amos Eaton, in his "Manual of Botany for North America," published in 1829, and also in a later edition published in 1840, still refers to this particular tree as the only one of the species known to exist. In 1842 Thos. Nuttall published a supplement to Michaux's "Sylva" and says, in regard to the "Bartram Oak:" "This curious tree, which in 1837 had attained a height of 50 ft., and a circumference of 3ft. 9 in., was inadvertently cut down, and with it the species, if such it was, appeared to be annihilated." In 1852 Henry R. Noll published a "Flora of Pennsylvania," in which he says: "*Q. heterophylla*, Michx., was founded on a single tree raised in Bartram's Garden, near Philadelphia, recently destroyed, which was doubtless a hybrid." * * * Thus during a period of about 100 years the only representative of the species of which any mention seems to be made was this one tree which had been destroyed. Seedlings from this original tree must however have been preserved, for in 1853 Mr. Thos. Meehan published "The American Handbook of Ornamental Trees," and from it I quote as follows: "The tree from which Pursh drew up his description was privately destroyed by some of Mr. Hamilton's gardeners (as I have been informed by Colonel Carr) because it interfered with a view of the Schuylkill from the Woodlands. A seedling from this tree at Bartram is seventy feet high and six feet in circumference. The leaves of this are considerably narrower than those of another tree at Marshall's garden; making it appear, without examination, like a willow oak." In 1860 Edward Tatnall published a "Catalogue of the Plants of Newcastle Co., Delaware," in which he says: "*Q. heterophylla*, Michx. (Bartram Oak) Low Woods, Townsend Station. Rare. Detected by Thos. Meehan, June 18th, 1860." In 1861 other specimens were collected at Mt. Holly, N. J., by S. B. Buckley, who wrote an exceedingly interesting "Note on the Bartram Oak," which was published in the Proceedings of the Philadelphia Academy of Natural Sciences for 1861. But the trees from which Mr. Buckley collected his specimens must have been known previous to that time, as there is a specimen in the Columbia Col-

lege Herbarium marked "Mt. Holly, N. J., Aug. 25th, 1855, W. Proctor." Since that time it has been found sparingly in several places in New Jersey, Delaware, North Carolina and finally, in New York, on Staten Island.

The question whether it is a distinct species, a variety, or a hybrid has been debated by nearly every botanist who has ever handled a specimen. Isaac C. Martindale, who has contributed the latest and most exhaustive treatise on the subject, says, at the end of his work: "In conclusion, I hope that the name given by Michaux, *Quercus heterophylla*, BARTRAM OAK, will continue to be maintained and its specific rank re established." Pursh considered it as probably a hybrid. Nuttall thought it might be an "anomalous variety of *coccinea*." Barton says: "supposed to be a hybrid." Torrey also considered it a hybrid. Noll says: "doubtless a hybrid." Meehan says that it partakes of the characters of *Q. Phellos* and *Q. imbricaria*. Buckley says that the tree at Mt. Holly is "in a thicket near several willow oaks (*Q. Phellos*), of which it is plainly one." Gray considered it "apparently a hybrid between *Q. Phellos* and *Q. tinctoria*." De Candolle mentions it as a variety of *Q. aquatica*. Leidy thought that a specimen which he obtained from Burlington Co., N. J., "indicated a hybrid between *Q. Phellos* and *Q. palustris*." Englemann contended for its specific rank at first, but finally came to the conclusion that it was a hybrid between *Q. Phellos* and *Q. tinctoria*. The opinions of a dozen other botanists might be quoted in regard to its specific varietal or hybrid characteristics, but all connect it in some way with *Q. Phellos*, either as related to or else as growing in company with it. Now this is precisely the way we find it at Tottenville, and as *Q. imbricaria* and *Q. aquatica* do not grow anywhere near this locality they may be thrown out of the calculation in discussing the question of hybridization; leaving only *tinctoria*, *coccinea* or *palustris* for the other parent species.

With the facts and material at present in my possession I incline to the belief that we shall eventually determine *tinctoria* to be the one. Of course the trees will be kept under observation and carefully studied, but it is too much to hope that they will escape destruction very much longer, as the woodman's axe has been busy in their immediate vicinity quite lately. Would that we only had some person upon the Island public spirited enough to save the present trees either by purchasing the piece of woodland where they are growing or else by carefully transplanting one or more of them to a place of safety and by so preserving one of the rarest and most interesting forest trees in the world. Staten Island should certainly have local pride enough in the matter to accomplish this result, now that attention has been called to it.

PROCEEDINGS

— OF THE —

Natural Science Association,

OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, Oct. 13th, 1888.

Meeting called to order at 8.20 o'clock.

Mr. Samuel Henshaw elected chairman,
pro tem.

Mr. Wm. T. Davis presented natural sized drawings of leaf forms and fruit of the hybrid oaks found near Richmond Valley, with the following further remarks upon the same:

Since the September proceedings were printed, the oaks near Richmond Valley, have been visited several times by Mr. Hollick, Mr. Gratacap and myself, and they have proved of so much interest that a detailed description of at least some of the trees may be worthy of record.

Nineteen oaks have so far been discovered, each tree having a sort of individuality, and their consideration with a view to clearing up the mooted points is no easy matter, but one that will at least require an extended period of careful observation.

Figures 1, 2, 3 and 4 represent what has been considered as typical *Quercus heterophylla*, and are from the tree which I first discovered while looking for willow oaks on the 15th of last July. It is 2 ft. 3 in. in circumference and about 40 ft. high. The fruit was not plentiful this Fall. The leaf represented at figure 3 is the most common type, though there are many like figure 4, some being without any lateral bristles.

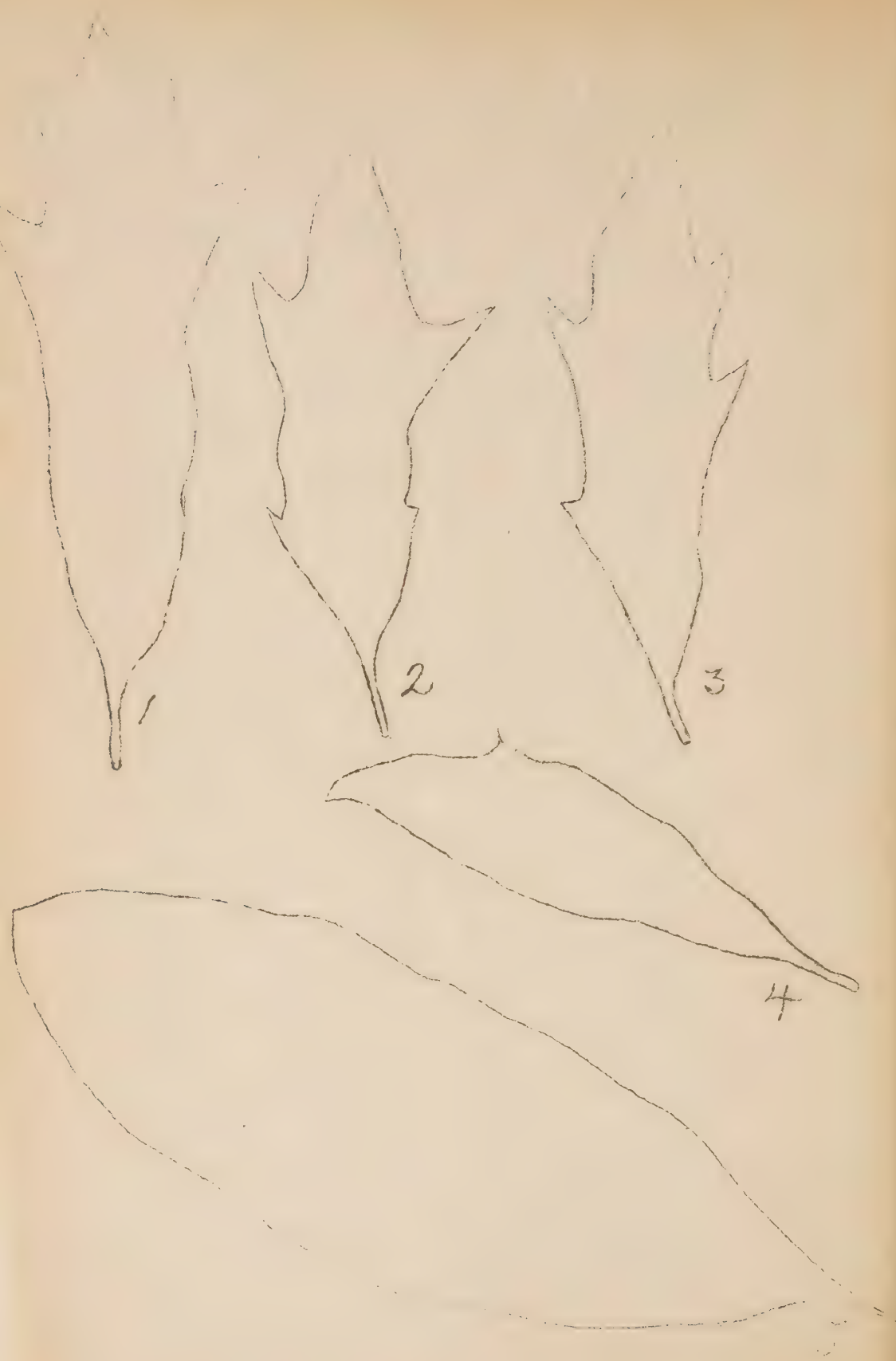
Figures 9 to 12 inclusive are from a large leafed member of the group, figure 12 being the prevailing form, with 9 and 11 only occasional. The tree from which these were taken is of good size and the acorns abundant, the space under it being thickly strewn with them on the day of our visit and every passing breeze brought more to the ground. One is shown at figure 13, and measurements made of a

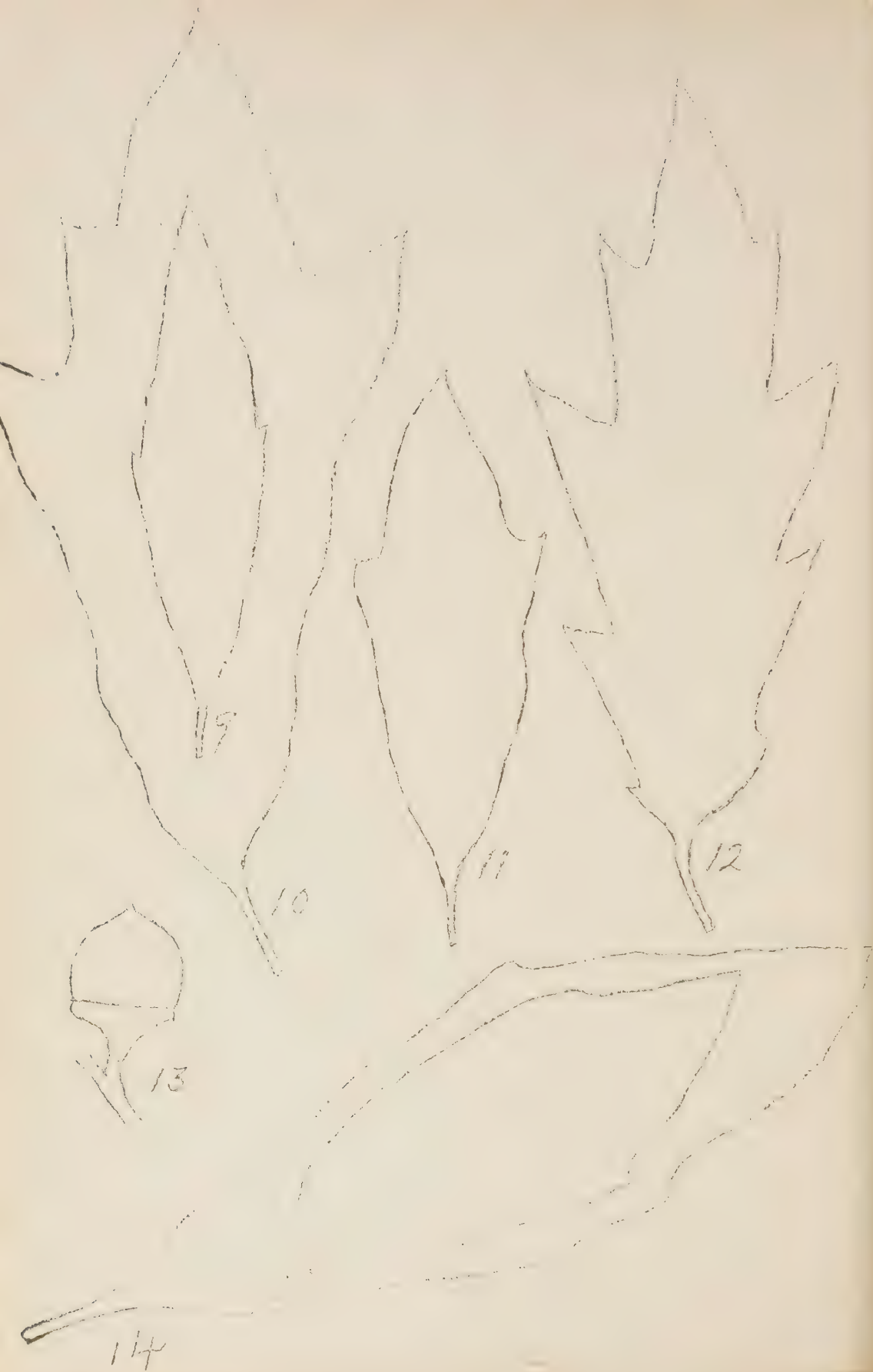
number of empty cups give the average diameter as 16 m. m. Figures 14 and 15 were made from examples taken from a large tree, 3 ft. 8 in. in circumference and about 50 ft. high, and though not the prevailing type of leaf, which is like figure 10, are nevertheless quite frequent. The acorns were not numerous, but those discovered (chiefly on the topmost branches) could not be distinguished from figure 13.

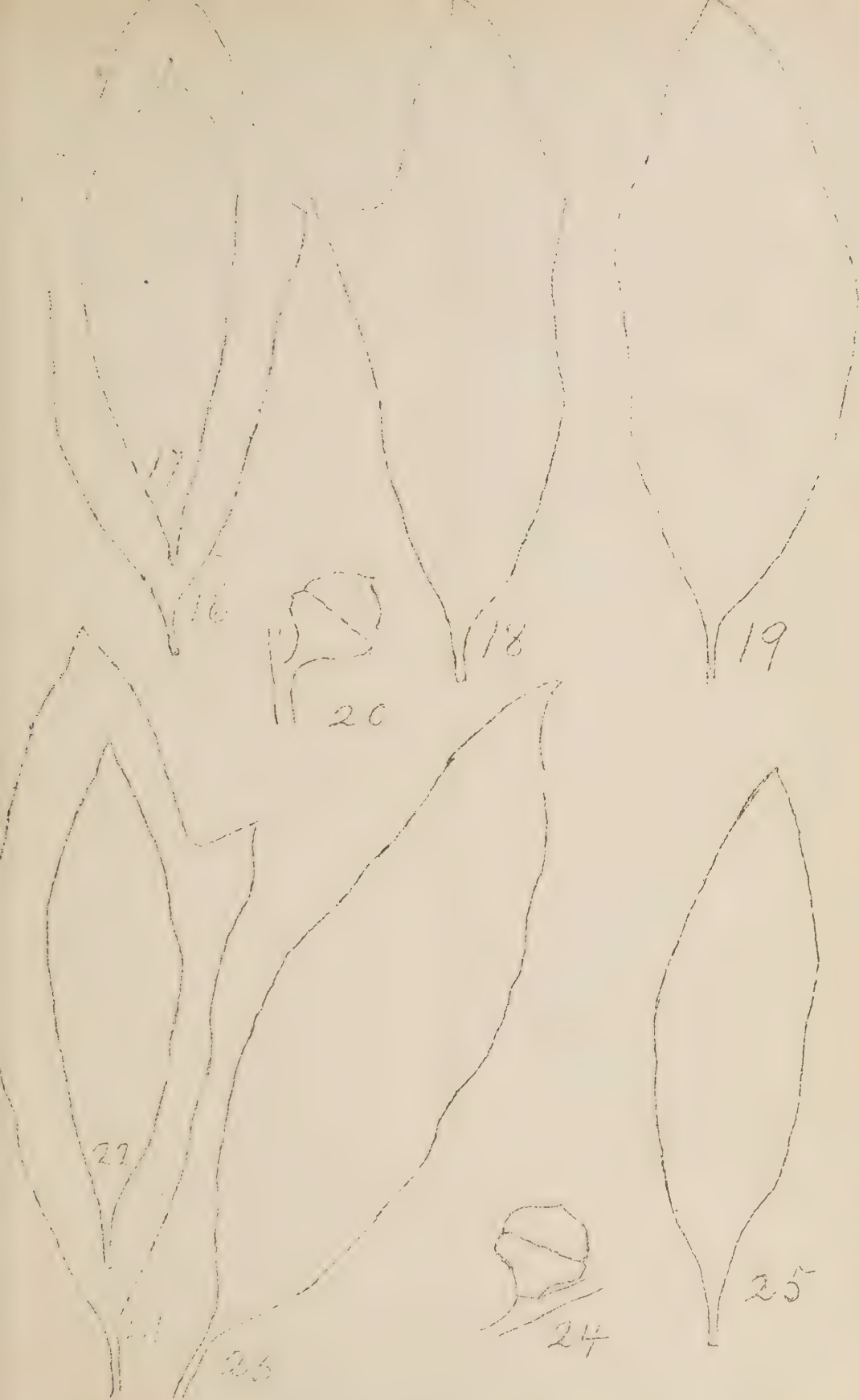
There are eight additional trees greatly like those just described and each one, as has been remarked, shows individual character, but a general resemblance in branching, foliage and acorns runs through them all. The leaves are not glossy on the upper surface, but in a few of the trees are slightly downy on their under side, along the mid-rib. The character and position of these oaks would indicate that *Q. Phellos* with *Q. palustris* are the parents and this latter tree abounds in the locality. The largest willow oak in the wood stands close to an equally big swamp oak and a typical *heterophylla* about six feet high is growing up within two or three yards of their trunks. This little tree is several hundred feet away from the others of its kind.

In *heterophylla* the average diameter of the empty cups is about 3 m. m. more than *palustris* and the height of the nut is also greater in comparison to its breadth. In *Phellos* the acorns are still smaller than in *palustris*, but it is an interesting fact that the proportions come closer to those of *heterophylla*. In Chambers Encyclopædia it is stated that in hybrids "valuable results are often obtained as to size and abundance of fruit."

Figures 16, 17, 18 and 19 represent leaves from a tree of quite a







7 1/2

17

16

18

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25



different character. The branches are sparingly clothed with a glossy foliage and the brown pubescence is quite heavy on the underside of the leaves, particularly along the mid-rib. The acorns (Fig. 20), which were plentiful this Fall, are small and come nearer to those of the willow oak, as does the prevailing leaf form (Fig. 18). The tree is about 30 feet high, the bark on the smaller limbs of a decided gray hue and there are many little branches growing out from the trunk.

Figures 21, 22, and 23 are from a tree quite like the one just described, only in this case the leaves, which are also glossy, are entirely covered on the under surface with a fine whitish green pubescence. The prevailing form is shown by Fig. 23, though lobed ones are also numerous. The tree is small, but acorns (Fig. 24) were not uncommon, especially near its top. The two trees just referred to are of much interest as they exhibit a great departure especially in form and size of acorns from typical *Q. heterophylla*, in fact show very little relationship. That they are hybrids is apparent, for the leaves exhibit no uniformity in lobing whatever. Some of the characters spoken of, especially in the account of the first of these two trees, would indicate a relationship with *Q. nigra*, but if this be true they are much further removed from *nigra* and nearer to *Phellos* than the tree from which the leaves represent by figures 5, 6, 7, and 8 were taken.

In this case, the large thick glossy foliage and stiff unbending branches, shows the tree to be nearer akin to the black jack than to the willow oak. The large leaf represented by Fig. 5 prevails, but on the branches stretching out over the sand dune and at the top of the tree forms 6 and 7 are not uncommon. There is another oak greatly like the one just

mentioned, which bore many acorns this Autumn. It is small, the majority of the leaves are unlobed and not as large as the one represented at Fig. 5.

There are four trees, one 3 ft. 6 in. in circumference, on which the leaves are of the same form, as those of the willow oak, only somewhat larger. A typical one is represented at Fig. 25, though many are half as large again. They bear acorns in abundance, and indeed the trees mentioned in this account taken as a whole, are quite as fruitful as the neighboring oaks of untainted specific character.

In addition to those mentioned, this low patch of sandy woodland contains fifteen willow oaks, some of them of good size, and it is an interesting feature that most of the hybrids and forms of unknown character are gathered about these patriarchal trees. Of course in a thick wood, like the one where they grow, where the cat brier, grape vines and little trees make progression anything but easy, a close inspection is almost impossible; and so, while the number of trees given cannot be any less, it is also certain that some inconspicuous ones still remain to be discovered.

A letter was read from Mr. Geo. Wm. Curtis, urging that steps be taken to preserve some of the trees. Mr. Henshaw suggested that a convenient and no doubt successful plan would be to graft specimens on some of our commoner oaks; as nearly all are too large to transplant without considerable difficulty.

The Corresponding Secretary announced that an index to the Proceedings was in course of preparation, to cover the five years of publication ending with the meeting at date. It will be printed and sent to all who have received the proceedings.

Adjournment at 9.45 o'clock.

PROCEEDINGS

OF THE—

NATURAL SCIENCE ASSOCIATION

—OF—

STATEN ISLAND.

VOL. II.

*Including the three years beginning Nov. 10, 1888,
and ending Oct. 10, 1891.*

Edited by ARTHUR HOLLICK, Secretary.

NEW BRIGHTON, N. Y.

[The price of this volume is \$2.50. Single Numbers, 5 cents.]

The Proceedings have been published consecutively since November 10th, 1883. Volume I. included the first five years of publication and was indexed at the end of that time. Some of the single numbers can not now be obtained, but a limited number of complete volumes are for sale, at \$2.50 each. Address the Secretary, New Brighton, Staten Island, N. Y.

PREFACE.

Volume I. of these Proceedings consists of sixty numbers and includes seventy-four pages. The present volume contains thirty-three numbers and includes eighty-seven pages. The two volumes are therefore approximately equal in size, although differing in the length of time covered by each.

In terminating this volume with the Proceedings of October 10th, 1891 consideration was also given to the fact that with the meeting of that date the Association completed the first ten years of its existence as a scientific organization and a new volume could be commenced with the beginning of the second decade. The pages are supposed to be numbered as follows, according to the dates of issue :

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Nov. 10, 1888

PROCEEDINGS

— OF THE —

Natural Science Association, OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, Nov. 10th, 1888.

Meeting called to order at 8.30 o'clock.

This being the annual meeting officers for the ensuing year were elected as follows:

President, L. P. Gratacap; Treasurer, Samuel Henshaw; Recording Secretary, K. B. Newell; Corresponding Secretary, Arthur Hollick; Curator, W. T. Davis.

The corresponding secretary read communications in regard to the recently discovered hybrid oaks near Tottenville, from B. E. Fernow, Chief of the Forestry Division, U. S. Department of Agriculture; Charles H. Peck, State Botanist; C. S. Sargent, Director of the Arnold Arboretum, and Geo. William Curtis. Several sets of specimens had already been distributed.

Dr. A. L. Carroll read the following paper upon "Bacteria":

The history of the bacteria is the history of the world, comprising all ages and all places. They exist in earth, water and air; they have been found in the mouths of Egyptian mummies, after forty centuries of bituminous "innocuous desuetude;" in the virgin soil of the pliocene era; in the coal of the palaeozoic period. The pride of ancestry may perhaps go back to the "promise and potency" of primordial protoplasm, and they may have antedated all other living things, for they represent the least complex form of vegetable life, some of them obtaining an adequate sustenance under circumstances where any other organism must starve. A little water—and they are not at all squeamish about its purity—is their principal need, but most of them can survive a long period of thirst without permanent injury to their constitution. They can hibernate through arctic cold, or luxuriate in tropical heat, the majority withstanding almost any temperature short of the boiling point, and some of their spores

resisting for a long while a heat of nearly 300° Fahrenheit. All are, however, fatally poisoned by homœopathic doses of corrosive sublimate, or other compounds of chlorine, iodine, bromine, and, to a less extent, by sulphurous acid or phenol. Peroxide of hydrogen [long mistaken for ozone] also seems to exert a rapidly destructive action on them. They derive their name of "schizophytes" or "schizomycetes" from the fact that they all are reproduced by simple subdivision or "splitting," though in addition to this mode of multiplication some of them also multiply by means of spores.

Despite the enormous amount of study which has been lavished upon these minute organisms, our knowledge of their biology is far from exact, and our classifications consequently unsatisfactory. It is not certain, on the one hand, whether morphological dissimilarities are mere variations induced by the environment, or, on the other hand whether apparent morphological identity may cover specific differences. Hence, many bacteriologists have advanced from the comparatively simple classification of Cohn to that of Zopf, with its 16 genera and 195 species, while some of the disciples of Billroth still hold that all are but developmental stages in the growth of a single plant.

In view of the universality of the schizomycetes, it is needless to say that there are none which come within the province of this Association as peculiar to Staten Island; but myriads of many kinds may be found here by anyone who has a high enough microscopic power to look for them.

The *Sphærobacteria*, or *Micrococci*, comprise most of the organisms which have been supposed to cause disease, as in erysipelas, diphtheria, scarlet fever,

whooping cough, pneumonia, suppuration, septicaemia, etc., and of these we have more than enough. They may appear as separate points, in pairs, [*Diplococci*] in chains! [*Streptococci*], or in clusters, [*Staphylococci*]. Many varieties are found in the soil, especially where filth-soakage has occurred, and every household can furnish specimens of different sorts. The *Micrococcus prodigiosus* sometimes forms a blood-red coating on musty bread, to the great delectation of believers in modern miracles; the *M. luteus* develops in a yellow layer on spoiled eggs; the *M. cyaneus* imparts a blue tinge to cloths soiled by purulent discharges; and there are others of diverse kinds always ready to avail themselves of an opening for business. A *Streptococcus* which thrives in brewery wastes is never out of employment in Richmond County, and may be discerned in the streams which are thus polluted.

Bacterium termo is the most omnipresent of all micro organisms, performing its scavenger work wherever putrescible matter exists, and multiplying rapidly to the limit of its means of subsistence. A larger congener, *Bacterium lineola*, is so commonly seen in impure water, among potatoes, and other appropriate feeding places.

Of the *Bacilli*, or rod-shaped micro-organisms, there are many species or varieties, *Bacillus subtilis* being the most ubiquitous. In the field of disease, we have the *Bacillus* discovered by Eberth in connection with typhoid fever; the alleged *Bacillus* of malaria; the *Bacillus* of pulmonary consumption; and there have been a few cases of malignant pustule on Staten Island, demonstrating the presence of the *Bacillus* of anthrax. In the soil are numerous forms, one of which is supposed to be the special agent in nitrification. The *B. amylobacter*, or *Clostridium butyricum*, causes butyric fermentation, and many of this group act as ferments in various media.

Vibrio serpens and *Vibrio rugula* inhabit decomposing infusions of all kinds, and may therefore be discovered in profusion in the gutter-water of any of our unclean neighborhoods.

The *Spirobacteria*, so called from their exhibiting one or more corkscrew-like twists, are common objects in our micros-

copic flora. The *Spirochaeta* of relapsing fever, though a native of Ireland, has not yet been naturalized in any of our election districts, but one closely resembling it may be observed in very slightly contaminated water, and another, the *Spirochaeta denticola*, exists in apparently healthy mouths and noses. *Spirillum undula*, *Spirillum tenue*, and the giant of the tribe, *Spirillum volutans*—which reaches the sea-serpent like length of nearly one-thousandth of an inch—may often be detected in dirty water or infusions. The slightly curved organism to which Koch ascribed the infection of cholera, and which was called the "comma bacillus," is now more properly classed among the *Spirilla*, and has two first cousins, indistinguishable from it morphologically, one of which exists in the human mouth, and the other in cheese.

The extreme minuteness of many of these organisms, some of which are barely within the bounds of visibility with the highest microscopic powers, renders it sometimes necessary to stain them in order for their detection, and much ingenuity has been exercised in discovering the most appropriate dyeing for different varieties.

The need of this may be appreciated when it is stated that the weight of a comparatively large *Bacillus* is estimated to be not more than one trillionth of a grain.

The remarkable family likeness between the members of some groups has led to the endeavor to differentiate them by their behavior under conditions of artificial culture, and numerous species have been constructed from their mode of development in nutrient media. This method of classification is so contrary to that adopted in any other branch of natural science that it will probably not stand the test of time and farther observation, and for this reason I refrain from giving any specific list. All the genera and nearly all the supposed species of every classifier are represented on Staten Island as well as abroad.

Notwithstanding their overwhelming numbers and the terror which once attached to the very name, it is to be remembered that the vast majority of the bacteria are not only harmless, but in their proper place beneficent, earning their living by destroying organic refuse, preparing for higher orders of vegetation, and doing their best to purify our soil from the filth with which some of us are constantly saturating it.

Adjournment at 10 o'clock.

PROCEEDINGS
— OF THE —
Natural Science Association,
OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, Dec. 8th, 1888.

Meeting called to order at 8.30 o'clock.
Mr. William T. Davis was elected
secretary *pro tem*.

Mr. L. P. Gratacap read the following
paper upon the "Relation Between the
Growth and Form of Leaves."

It is obvious that the form of leaves
must be the resultant of rates of growth
in various directions. That a simple leaf
with a single midrib will assume such a
mature form as will express the equilib-
rium of the growing impulse along two
axes, a longitudinal and a lateral one,
and that as this ratio varies in favor of the
first or the second, the leaf becomes ovate,
circular, broadly elliptical, &c. or lat-
ceolate, linear and elongated. And second-
arily, in the case of the simple leaf, the
point of intersection of the axis will
modify the final form. If the lateral axis
is developed at an early stage in the
elongation of the midrib we have ovate
leaves, if at a point half way along its
length elliptical, if at the distal extremity
obovate. And in leaves of a complex
structure, whether palmate, pinnate or
numerously veined with woody and rigid
vascular fibres, we can resolve the entire
form into a group of simple forms, where
in we may study the related rates of
development in lamination (formation of
parenchyma), and in vasculature (forma-
tion of ribs, veins, &c.). In other words,
the rapid movement forward of rib
cells would appear to interfere with or
prevent the making of the leaf lamina,
and their slow movement to assist it. In a
leaf with several ribs the slow progress of
the rib making permits the coalescence of
the marginal tissues, and forms polygonal
and crenate circular leaves, and also tends
to introduce bifurcation and deliquescence
of the original fibre bundles. In one
where the extension of the ribs is rapid
this coalescence is checked and the leaf is
sinuate, lobed, irregular and pinnatifid.

It is thus apparent that a determination
of the actual rate of growth in leaves may
throw some light or be useful in assisting
speculation as to the origin of leaf forms.
And it is also apparent that there might
be a condition of things exactly the
reverse of our supposition given above,
and yet produce the same result. That is,
a linear leaf might be a, so to say, slowly
made leaf as well as a quickly made leaf,
if the movements of its parts maintain a
ratio which gives extension in length and

not in breadth. And in many cases of
turgid and dense tissues in leaves this
is probably so.

However the measurement of a number
of leaf growths including those of Morn-
ing Glory, Mush Melon, Water Melon,
Maples, *Magnolia*, Peach, Japanese
Quince, Five Finger, &c. made this year
on Staten Island, do seem to show that the
elongated leaves grow much the more
rapidly, that the palmate and pinnate
leaves stand next in order, and the circular
and transverse leaves last. [A diagram
was here presented showing these results,
in part, with the rate per day of growth;
also the slowly diminishing rate of growth
of the leaf as it approached completion.]

Of course a number of considerations
occur at once to modify the wholesale
use of this conclusion. The relative size
of the leaves compared should be similar,
the condition or healthfulness of the
plants alike, the nature of the plant tissue
nearly the same, and the position and
aspect of the leaves as regards favorable
or unfavorable conditions for growth
identical. The subject is suggestive and
carefully followed up might lead to in-
teresting results.

Mr. Arthur Hollick showed fossil leaf
impressions in ferruginous sandstone,
found near Arrochar station by Mr.
Gilman S. Stanton. They are undoubtedly
from the same formation as those from
Tottenville (Cretaceous?) described in the
Proceedings of December 8th, 1883, and
like them, were not in place where found,
but occurred in Drift rocks. The spec-
imens are too fragmentary for determina-
tion, but the fact of their discovery at this
new locality is a matter of interest and is
therefor placed upon record.

Specimens of boulder clay from the
same locality were also shown. It has
been lately utilized for brick making.
There is a fine exposure of modified drift
overlaid by boulder drift where the rail
road has been cut through.

Dr. A. L. Carroll noted the discovery on
Staten Island recently of *Bothryoccephalus*
latus—the first reported occurrence of this
parasitic worm in America.

Specimens of the "Large Mocker Nut,"
(*Hicoria alba*, (L.) Britton, *var. maxima*,
(Nutt.) Britton.) were presented—being an
addition to the local flora. They were
collected by Dr. Britton near Court House
station.

Adjournment at 10 o'clock.

PROCEEDINGS

— OF THE —

Natural Science Association, OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, Jan. 12th, 1889.

Meeting called to order at 8.30 P.M.

Mr. Arthur Hollick was elected chairman *pro tem*. The resignation of Mr. K. B. Newell, as recording secretary, was received and accepted and Mr. Ernest A. Congdon was elected to fill the vacancy.

Mr. Hollick stated that another effort was to be made, at the present session of the Legislature, to obtain control of the Billopp House and secure it for public property, and suggested that the Association take some action to show its interest in the matter.

On motion of Mr. Samuel Henshaw it was

Resolved, That the chairman be and is hereby empowered to appoint a committee of three, with power to act for and represent the Association in all matters pertaining to the Billopp House and its proposed purchase for public property.

The chairman appointed as such committee Messrs. Ira K. Morris, N. L. Britton and Arthur Hollick.

Mr. Wm. T. Davis read the following notes in regard to the appearance of shad along our shores:

It has been the custom among those engaged in shad fishing in the bay to preserve a record of their first catch, which sometimes merely consists in chalking the date on the beams in the houses where they keep their nets and live, so as to lose no time at the turning of the tide. In one of these houses I copied the following dates, posted on the rafters overhead, as already described:

April 3, 1873; March 30, 1874; March 3, 1878; March 30, 1879; April 4, 1880; April 5, 1881; April 4, 1883 April 9, 1884,

49 fish taken; April 11, 1885, 1 fish taken; April 11, 1886; April 9, 1887, 36 fish taken; April 11, 1888, 29 fish taken.

Mr. Wm. H. Wardell, who lives at Bay Ridge, Long Island, but who fishes from the Staten Island shore, has given me the following record of his first captures:

April 3, 1878; March 29, 1879; March 28, 1880; April 9, 1881; April 5, 1882; April 5, 1883; April, 1, 1884; April 3, 1885; April 5, 1886, April 7, 1887; April 11, 1888.

One of the signs of the Indians' calendar was the blossoming of the "shad bush," (*Amelanchier*), which occurs about the middle of April, and it will be seen from the above dates to be an excellent guide, for it is not until its flowers appear that the fish come in numbers.

Mr. Chas. W. Leng presented the following memorandum: In the Proceedings of April 14th, 1888, a correction must be made in regard to the pupation of water beetles, the fact being that they pupate not under water, but in soil. Mr. Davis has this year raised the larvæ of *Hydrophilus triangularis* and supplied a part of the larvæ with soil under water and others simply with soil. The first lot refused to pupate, while many of the second lot formed pupæ in the ground.

The corresponding secretary read communications in regard to the Tottenville hybrid oaks from C. S. Sargent, Isaac Burk, Wm. M. Canby, Edward Tatnall, Thos Meehan, A. Commons and other botanists, evincing great interest in the recent discovery of these trees and the published papers concerning them.

Adjournment at 10 o'clock.

Feb. 1, 1821

PROCEEDINGS

— OF THE —

Natural Science Association, OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, Feb. 9th, 1889.

Meeting called to order at 8.25 o'clock.

Mr. Arthur Hollick elected secretary
pro tem.

On motion of Mr. Hollick it was resolved, that hereafter the regular monthly meetings of the Association be held on the second Thursday of each month.

The committee on the Billop House, reported progress.

Mr. Chas. W. Leng read the following paper upon "The Buprestidae of Staten Island," illustrated by specimens of the species mentioned:

The Buprestidae are a family of Coleoptera of which the principal characteristics are the serrate antennae and the connate first and second ventral segments. They have in general a brilliant metallic lustre and a more or less elongated flattened form. The perfect insects are found either on flowers or sunning themselves on trees during the Summer months and their life is always a short one. The larvae perforate the stems of living plants, taking a year or more to perfect their growth and transformations.

The name is an old one and Dr. Harris states that the *Buprestis* of the ancients, as the name signifies in Greek, was a poisonous insect, which being swallowed with grass by grazing cattle, produced a violent inflammation and such a degree of swelling as to cause the cattle to burst. Linnaeus applied the name to this family, and popular English writers on Natural History sometimes give the name of "Burn-cow" to the Buprestidae in allusion to the original signification of the word, while they are in reality harmless in the perfect state, injuring no animal, and damaging flowers and leaves to a slight extent only.

The larvae are, however, destructive

wood-borers and attack a variety of forest and fruit trees, oaks, pines, firs, apples and peaches being especially subject to injury. The eggs are laid in or under the bark and hatch into tiny worms which eat their way in winding burrows of an oval section through the trunk, growing big and fat on their woody diet. These worms or larvæ are yellowish white in color, elongate and flattened and have the prothoracic segments greatly enlarged, giving them a distinctive appearance. They are without legs and effect their progress by alternate contractions and elongations of the segments, assisted by their jaws. Except the jaws, the larvæ are soft. When about to transform into pupæ, the larvæ work their way until directly under the bark, which they partly perforate, leaving the helpless pupa sufficiently protected and rendering the egress of the imago as easy as possible.

It is thought that the larvæ of many species take years to perfect their growth and an instance is recorded of a *Buprestis* emerging from the wood of a desk that had been in use for 20 years. One of our commonest species, *Chrysobothris femorata* is, however said by Packard to complete its transformations in twelve months, so the usual period is uncertain.

This insect is found every year in numbers on oaks and occasionally other trees. I took the greatest number about 1880, when Mr. Davis and I found a log near Silver Lake literally alive with them. They would take short flights and lighting on the log, hide in the crevices of its bark, which by their color and deep wrinkled furrows they simulate to a degree. Many other species have this restless habit of flying from place to place, and on the wing, look and buzz very like flies.

Two species of *Agrilus* are also abundant—*ruficollis* and *otiosus*—the first usually on wild blackberries and the second on a variety of young saplings. When the trees around Martling's Pond were cut down about three years ago, a growth of saplings sprang up on which the species of *Agrilus* were quite plentiful and besides many *otiosus* an occasional *bilineatus* or *interruptus* was found.

I have never found any of our other species in great numbers. Of the *Anthaxia* all my specimens have come from a clump of wild cherry in the Clove Valley. *Chalcophora* is said to breed in pine but a good deal of beating has yielded little. The species have been found washed upon the beach and one specimen of *liberta* was taken by Mr. Davis flying at Watchogue. Two species of *Brachys* occur on the leaves of certain oaks and I have found them in North Carolina in great numbers. Probably they will be found abundantly somewhere on Staten Island.

Chrysobothris azurea was a notable capture of 1886 and is everywhere counted a rare insect, but from May to July of that year it was plentiful on a species of dog wood, in a thicket now burned over and turned into "Prohibition Park." The house built as I am told for the dominie stands just above where the first was taken. The beetles were very quick in their movements and were captured by beating the trees over an umbrella, out of which they flew again as soon as they touched it. Several were observed resting on the main stems of the young trees with the anterior legs extended and the last ventral segment touching the bark and they were probably females depositing their eggs. None have been found since 1886, nor have

I been able to find the larvæ in the few trees that are left.

The following is a list of all the species I have so far found on Staten Island and of several found only by Mr. Martin Livell of Brooklyn which are marked ‡. Of these the last named *Mastogenius subcyaneus* is one of the smallest *Buprestidae* known.

Chalcophora Virginiensis, Drury,

" *liberta*, Germ,

Dicerca divaricata, Say,

" *obscura*, Fab,

" *asperata*, Lap. and Gory. One specimen in the cabinet of Mr. Wm. T. Davis.

" *obscura*, Fab,—var. *lurida*, Fab,

Buprestis lineata, Fab,

" *fasciata*, Fab,

Melanophila longipes, Say,

Anthaxia viridifrons, Lap,

" *viridicornis*, Say,

‡ " *quercata*, Fab,

Chrysobothris femorata, Fab,

‡ " *dentipes*, Germ,

" *azurea*, Lec,

‡ " *6-signata* Say,

Actenodes acornis, Say,

Acmaeodera culta, Web,

Eupristocerus cogitans, Web,

Agrilus ruficollis, Fab,

" *otiosus*, Say,

" *bilineatus*, Web,

" *interruptus*, Lec,

• ‡ " *Lecontei*, Saund,

‡ " *acutipennis*, Mann,

‡ " *egenus*, Gory,

Taphrocerus gracilis, Say,

Brachys ovata, Web,

" *aerosa*, Melsh,

Pachyscelus laevigatus, Say,

‡ *Mastogenius subcyaneus*, Lec,

Adjournment at 9.30 P.M.

Mar 14 1887

PROCEEDINGS

— OF THE —

Natural Science Association,

OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, March 14th, 1889.

Meeting called to order at 8.15 o'clock.

The committee on the Billopp House reported that they had been unable to come to any agreement with the representatives of the Aspinwall estate. On motion the report was accepted and the committee continued.

Attention was called to the recent death of Mr. S. Lowell Elliot, and on motion of Dr. N. L. Britton the following committee was appointed to draft suitable resolutions: L. P. Gratacap, E. A. Congdon and C. W. Leng. The following preamble and resolution was subsequently presented and adopted.

Whereas, In the death of Mr. S. Lowell Elliot the Natural Science Association of Staten Island recognizes the loss of a skillful observer, a trained collector and an enthusiastic friend of science,

Resolved, That this Association desires to express its sincere sympathy with his family in their bereavement, and to record its appreciation of Mr. Elliot as an indefatigable and experienced worker in entomology.

Mr. L. P. Gratacap showed specimens of fossils from a drift boulder and gave the following account of the same:

Mr. C. S. Egbert in excavating a foundation for a house at Fort Wardsworth station on the Rapid Transit Railroad, on the north side of the Finger-Board road, and a few hundred feet northeast of the station, uncovered a boulder of Oriskany Sandstone which upon examination by Mr. Wm. T. Davis proved to be of great interest. It was a compact mass of fossils representing over twenty species characteristic of that horizon, of which fourteen were new to our list previously published (Extra No. 6; March 1887.) Amongst these were some of considerable rarity, and while many were in a fragmentary condition or preserved as impressions only, they were all unmistakably

identified, and form a valuable addition to our palæontological possessions.

The list of new additions is as follows:

Pholidops arenaria, Hall.

Streptorhynchus hipparionyx, Vanuxem.

Strophodonta magnifica, Hall.

Chonetes camplanatus Hall.

Leptæna nucleata, Hall.

Spirifera pyxidata, Hall.

Leptocelia flabellites, Conrad.

Eatonia peculiaris, Conrad.

Rensselaeria ovoides, Eaton.

Pterinea Gebhardi, Hall.

“ *textile*, Hall.

Aviculopecten rectirostris, Hall.

Platyceras nodosum, Conrad.

Platystoma ventricosum, Hall.

Mr. Arthur Hollek exhibited mounted specimens of new or noteworthy additions to the local flora and read the following memoranda in connection with them:

Since the fourth appendix to the Flora of Richmond County was published, about two years since, there have been many plants found which require recording. The full list, containing thirty-six species and varieties new to our Island's flora, will be published as usual in the *Bulletin of the Torrey Botanical Club*, as the fifth appendix. Reprints of the same will be distributed to all those desiring them. Memoranda in regard to some of the species have been published in our PROCEEDINGS, while others have not been recorded, although of considerable interest.

For several years specimens of a peculiar *Ranunculus* were collected in the Clove Lake Swamp. They were classed under the species *fascicularis*, the common Early Buttercup, although plainly not identical with it. The most remarkable characteristic of all the plants was a tendency to fasciation which showed itself year after year, and may be seen in all the specimens collected. The species has lately been determined to be *Ranunculus septentrionalis*, Poir. Thus far it has not been found in any other locality on the Island.

In studying the herbarium of the late Wm. H. Leggett many plants were noted as having been collected on Staten Island. Amongst the most interesting were several specimens of *Lechea racemulosa*, Lam., from Tottenville, mixed with

and included under the name of *L. thymifolia*, Michx. (*Tsuga Canadensis*, L.) was found near Old Place, Michx.

Trifolium hybridum, L., supposed to be a hybrid between the Red and White Clovers, is becoming more common and may now be found along many of the streets of New Brighton and also on the filled-in ground at St. George.

A species of Honeysuckle was admitted into the last appendix under the name of *Lonicera ciliata*, Muhl. A single bush in flower was found in some cedar woods just North of Garretsons. It was undoubtedly native where found. Since then Mr. Wm. T. Davis has discovered the plant, in fruit, in a similar situation at New Brighton. With the material now in our possession we are able to determine it to be *L. xylosteum*, L., the European Fly Honeysuckle, which has somehow become established and thoroughly naturalized here, probably through the agency of birds.

On May 30th, 1888, a single plant of *Cynoglossum officinale*, L. was found in a field near Richmond. The only other time that this plant was reported from the Island was in 1880, when a single specimen was found near Concord.

Amarantus hybridus, L., in every stage of hybridization between the green Pigweed and the red Prince's Feather is common along the streets and in waste places in New Brighton.

Thus far I have failed to find a Butternut tree growing here independent of cultivation, but in the Trans. N. Y. State Agric. Soc. for 1843 there is a list of the trees common on Staten Island, by Dr. Samuel Ackerly, and this tree is included in the list, under the name of *Juglans cathartica*, Michx. It is quite possible that at that time it may have been native here.

Mr. Wm. T. Davis has reported the discovery of several more trees of *Betula nigra*, L., the Red or River Birch, near Richmond, Annadale and Old Place, but the total number of trees is so small that the speedy extermination of the species on the Island is certain.

Salix purpurea, L., the Basket Willow, has become established in several localities notably near Garretsons and Old Place. These trees no doubt originated from cuttings of cultivated trees which were thrown aside in rubbish heaps. At Garretsons their presence is easily accounted for by the old plantation belonging to the late John Reed, which has been cultivated for generations. No doubt at Old Place there was also a plantation, although no indication of it was noticed. A single isolated tree was found on a roadside near Woodrow.

A single tree of the Hemlock Spruce

Place. It is a somewhat conspicuous object as it is the only large tree, and an evergreen at that, left standing in a recently cleared place of woodland, where all the surrounding hard wood trees have been cut down.

In the sandy soil at Mariners' Harbor, Watchogue and Kreischerville occurs abundantly a form of Cat Brier, which is clearly a variety of the common *Smilax glauca*, Walt. The leaves are narrow and elongated, often constricted in the middle so as to be almost middle-shaped, and the stem, especially at the base, is thickly beset with prickles. It agrees with the description of the so-called *S. spinulosa* Smith.

Several of the plants admitted into our catalogue without having been personally seen have been discovered within the past two years. Amongst them may be mentioned *Lathyrus maritimus*, (L.) Bigel., the Beach Pea. This was admitted on the authority of a specimen in the herbarium of the late Dr. Samuel Elliot and it now turns up at New Dorp near the old race course.

Pycnanthemum incanum, (L.), Michx., admitted on the same authority, grows on Ocean Terrace.

Salix tristis, Ait., the Dwarf Gray Willow, was credited to Staten Island about twenty years ago in the *Bulletin of the Torrey Botanical Club*. There is a small patch growing south of the railroad between Richmond Valley and Tottenville, within a few yards of the hybrid oaks described in our PROCEEDINGS for September and October, 1888, which is probably the same locality where it was originally found.

Sabbatia dodecandra, (L.) (S. *chloroides*, Pursh.) was reported by Mr. E. M. Eadie from near Chelsea. It was found in the Autumn of 1887 growing abundantly on the salt meadow near Kreischerville.

Dr. N. L. Britton showed specimens of yellow gravel and kaolin and remarked upon a recent discovery of another exposure of the Cretaceous strata which are known to underlie a considerable portion of Southfield and Westfield. This new exposure is on the Fingerboard Road about a quarter of a mile east of Grassmere Station. A cutting in the north side of the road shows a section of glacial and modified drift, under which may be seen some of kaolin similar to that which is so extensively dug near Kreischerville. This is associated with a small amount of yellow gravel. He stated that it could not be positively determined whether the kaolin was exactly in place or had been ploughed up from below and enclosed in the moraine as at the Prince's Bay bluff, already described in the PROCEEDINGS (November 8th, 1884.)

Adjournment at 10.20 o'clock.



PROCEEDINGS
— OF THE —
Natural Science Association,
OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *April 11th*, 1889.

Meeting called to order at 8.30 o'clock.

Dr. N. L. Britton called attention to several specimens of silicified fossils found by Mr. Arthur Hollick in the white Cretaceous gravel on the side of a brook near Prince's Bay. They consisted of a brachiopod mollusk, allied to *Pentamerus*, a cyathophylloid coral, perhaps *Zophrentis*, and a third one, probably a sponge. Dr. Britton remarked as follows: This is one of the most interesting discoveries recently made in our local geology and is of much more than local importance inasmuch as it affords valuable evidence towards establishing the origin of the formation known as the Yellow Gravel or Pre-glacial Drift, which has been frequently alluded to in our PROCEEDINGS. I have been especially interested in this latter formation for several years, as it has been a much debated question whence came the yellow gravel and sand composing it, and from which it derives its name. There were difficulties in the way of accepting hypotheses, advanced by several eminent authorities, that it came either from the northwest or southeast. After a careful survey of a large part of the region where it is found in New Jersey, I had arrived at a conclusion, as long ago as 1883, that it had been derived from the erosion of Cretaceous strata containing gravel, outcropping in the vicinity, and that after erosion it had been colored by ferruginous waters. [See Trans. N. Y. Acad. Sci., Vol. IV.] That this coloring is merely more or less on the surface may be seen by breaking the pebbles composing the gravel and noting the white interior portions. The discovery of these fossils in the Cretaceous gravel goes far towards strengthening this conclusion, for it

is a well known fact that similar fossils occur in the Pre-glacial Drift and we have specimens in our cabinet from the Prince's Bay Bluff and Todt Hill, as previously reported to the Association. The beds of white gravel must lie near the base of the Cretaceous system and form the exposures at Glen Cove, N. Y. and Camden, N. J. They are known to be of considerable thickness and extent and as there is unmistakeable evidence of some hundreds of feet of erosion from all this part of the country since the Cretaceous era there is nothing extraordinary about the proposition. The problem still remains however, where did these silicified fossils come from originally? We have traced them back one step further, from the Pre-glacial Drift to the Cretaceous gravels but that is as far as we can go at present. There are ledges of rock from which they might have been derived in Morris County N. J., but the abundance of silicified fossils in the Pre-glacial Drift would seem to require some less remote source.

Mr. Hollick described a recent visit to the Triassic outcrop at Mariners' Harbor, in company with Dr. Britton. This outcrop was mentioned by Wm. W. Mather in the Geology of New York, where he says (see page 285). "In Richmond County (Staten Island), the red sandstone occupies but a small area where it can be observed * * * * it is believed to range from between Berge Point and Shooters Island south-south-westwardly, to the Freshkill marshes. It is generally covered by soil, drift deposits, and the sand and clay beds. It may be seen at very low tide, on the shore, about southwest of Bergen Point. It is the

slaty, micaceous, fissile, red sandstone and shale." On page 294, in speaking of so-called bird tracks found in the same sandstone in Connecticut, he says: "I have seen no tracks on the red sandstone of Rockland and Richmond Counties, but they may very possibly be found there. My researches were necessarily very limited, in examining this, and in fact all the regions explored in New York." The beach within the limits above described was carefully examined, and although the tide was high the existence of the outcrop was clearly demonstrated. Fully three fourths of the shingle is composed of red sandstone, and shale and at a point immediately to the west of the foot of South Avenue there is a portion of the beach composed entirely of red clay and decomposed red shale, which is undoubtedly the outcrop described by Mather, although very much broken up by the action of the waves and weather. At this locality a large flat piece of red sandstone was found containing well defined impressions of some vegetable remains, probably algae. [The specimen was here presented]. There does not seem to be any other record in regard to this outcrop since Mather so briefly mentioned it, in 1843, and this specimen is probably the only Triassic fossil ever found in place on Staten Island. These facts should be recorded at the present time as no doubt the shore is destined to be "improved" at no very distant date and then the outcrop will suffer the same fate as that of the tremolite at New Brighton and the granite at Tompkinsville. There are indications that the Triassic strata are very near to the surface at other localities, especially where a new road is being cut through towards Erastina station. Along one portion of this road the soil is composed entirely of red clay and broken red shale, similar to that upon the shore.

Mr. Wm T. Davis read the following letter:

NEW YORK, March 27th, 1889.

MR. WM. T. DAVIS,

DEAR SIR:—In reading over the proceedings of your society in the STANDARD, you (the proceedings) say there are no natural butternut trees on the Island. In the Town of Westfield, along a stream known as Sandy Brook, there was a natural grove of them extending over nearly half a mile; many of them are there probably yet. This brook is the head water of Lemon Creek, which runs into

Prince's Bay: Part of the trees stood in a wood of my fathers; the brook runs in a northerly direction from the Amboy road and crosses the Woodrow road.

Yours,

A. WINANT.

Mr Davis presented further notes upon the locality and exhibited some butternuts from the trees referred to. Sandy Brook is quite appropriately named. Its course for about a half a mile is through a loose sandy soil and in some of the adjoining fields the Yellow Drift is sparingly represented, the sand being particularly free from stones of any kind. The yellow gravel is a feature of the neighboring hills. The butternut trees grow in this sand near the brook and at the present time about ten full grown and a few small ones are standing. A tree leaning over the brook, and to which fence rails have been nailed, measures, at about a yard from the ground, five feet one inch in circumference, and several of the others are nearly as large. They are well known to the people in the vicinity, and one old woman said she had gathered a half a bushel of the nuts last Fall. Further along the brook, when the character of the soil changes, boulders and the usual red drift material prevailing, none of the trees were observed. A colloquy held with a negro elicited the information that he had found one or two trees, years ago, in the woods, so they may be distributed sparingly over the adjacent territory. As might be expected from their character these sandy field were favorites with the indians and many of their implements are to be found there. Also it may not be inappropriate to mention this locality as a new one for the yellow pine (*Pinus mitis*), a few trees growing on the neighboring hills, principally in the groves of *Pinus inops*. Of the latter trees there is one clump in particular that deserves to be recorded, on account of the size, number and beauty of the trees, which have grown close together.

Mr. Jas. Raymond presented an indian axe, found during some excavating on the old Dongan estate at West New Brighton. Also two net sinkers from Totteville. Mr. Davis presented a hammerstone from the locality above mentioned, near Sandy Brook, and Mr. Hollick reported finding a similar implement and some pottery at the same locality. Dr. Britton showed a skin scraper, found near the Vanderbilt Mausoleum, and two arrow heads from Mariners' Harbor. Also specimens of stilbite, from the upper Graniteville trap quarry—a mineral new to the Island.

Adjournment at 10 30 o'clock.

PROCEEDINGS
— OF THE —
Natural Science Association,
OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, May 9th, 1889.

Meeting called to order at 8.15 o'clock.

The resignation of Mr. Ernest A. Congdon as Recording Secretary was read and accepted and Mr. Chas. F. Simons was elected to fill the vacancy.

On motion of Mr. Hollick the President was authorized to appoint a committee of five, including himself as chairman, to consider and report the possibility of obtaining a building fund for the Association. The President appointed as such committee: L. P. Gratacap, Dr. N. L. Britton, Arthur Hollick, Charles F. Simons and E. M. Eadie.

A communication was read from Mr. Joseph C. Thompson, noting the capture of a twenty one pound snapping turtle on the south side of the Island. It was two feet nine inches in length, with a carapace measuring fourteen inches in lateral and ten inches in transverse diameter.

A specimen of *Labia minor*, a species of earwig new to the Island, also captured by Mr. Thompson, was shown by Mr. Wm. T. Davis. It is found in New England and occurs commonly in Europe.

Dr. N. L. Britton presented the celt or skin scraper, shown at the last meeting, with the following memorandum: The implement was found by Mr. Booth Davy, Assistant Superintendent of the Moravian Cemetery, near the Vanderbilt Mausoleum, about eighteen inches beneath the natural surface of the ground, at the foot

of a large hickory tree. No other evidences of Indian occupation were noticed in the vicinity. Mr. Davy desired to present it to the Association.

Mr. E. M. Eadie showed a large lance or spear head from Watchogue.

Mr. Arthur Hollick presented specimens of the sandstone containing fossil vegetable remains, from the shore at Tottenville. Also similar stone from the shore at Perth Amboy. At this latter locality it was found in place, in the form of concretions, in an irregular layer at the top of the Cretaceous clay. The rock contained besides vegetable remains, impressions of mollusca. This find is another important link in the chain of evidence identifying our Tottenville fossil leaves with the Cretaceous formation, and it is probable that the clay is almost at the surface at this locality, where it is covered by the Drift. This supposition is borne out by the fact that a new outcrop of Cretaceous clay was discovered at low tide on the beach, about a quarter of a mile west of the Prince's Bay light house. The same sandstone occurs there, where the junction of the Drift and Cretaceous may be seen. It has not been found in the Drift under any other circumstances.

A list of Staten Island fungi, named by Mr. J. B. Ellis, from specimens in the cabinet of the Association, was presented for publication.

Adjourned at 10 o'clock.

PROCEEDINGS

— OF THE —

Natural Science Association,

OF STATEN ISLAND.

VILLAGE HALL, NEW BRIGHTON, *June 13th, 1889.*

Meeting called to order at 8 o'clock.

Mr. Ira K. Morris called attention to the old Court House bell, recently transferred by the Superintendents of the Poor into the custody of the Association, and read the following account of its times and associations:

THE OLD COURT-HOUSE BELL—ITS TIMES AND ASSOCIATIONS.

At a time when Pearl street was regarded by the people of New York City as "The Old Trail," and the upper terminus "was way out of town," there stood beside it probably the only bell foundry in the country. It was owned by a Spanish firm, who carried on the business of bell-making in connection with the ordinary work of metal casting. I am informed that from this rude and obscure structure bells of meagre size, but of fine calibre, were sent to scores of ambitious villages throughout the country. The date of the establishment of this foundry is not exactly known; but circumstances would indicate that it was not until after the close of the Revolution. In some historical work recently I was obliged to study the location of the buildings, etc., in that particular part of Manhattan Island, and I failed to discover the existence of the foundry prior to 1782.

The first Court House and County Jail of Richmond County, which stood near "Stony Brook," between 300 and 400 yards south of the site of the old "Black Horse Tavern," at New Dorp, was erected about 1683. It was a small, one-story structure, containing two rooms. One, built of roughly hewn logs, "filled in" with clay and shell-lime, served as the County Jail. The only door to it was built of rough slabs, hung on raw hide hinges, and opened outward. A window, about a foot square, which the prisoners could regulate for their own comfort by filling in with brush, when the rain, snow or cold crept in, was the only other opening. The "jail" contained a ground floor, and its furniture consisted of a bench-like log, which extended along the rear of the room. The "lock" was made of strips of raw-hide, which were tied on the outside. But the dignity of the law was so frequently trampled upon by the escape of prisoners,

through the assistance of outside friends, under the cover of darkness, that the Presiding Judge directed the county officials to "forthwith purchase a more substantial lock, and to procure a bell wherewith to give alarm, in case there should be any further attempt of prisoners to escape from ye said jail." After due consideration of the matter, on the part of the county officials, an appropriation to meet a portion of the pressing need was made. The room adjoining the jail was built of stone, and was occupied by the Sheriff—its first occupant being John Palmer. He was also the Jailor. In this room, too, the "Court business" of the county was frequently transacted; but the meagre accommodations it afforded "the rude forefathers of the hamlet" rendered it necessary to hold Court at various other parts of the Island, in the more spacious Holland-cottage homes of prominent officials. Around this rude structure sprang up the first village of any importance on Staten Island. Here, amid the wild haunts of the native Indian, the persecuted Huguenots built an edifice wherein to worship God, according to the honest dictates of conscience; and here, too, generation after generation laid their dead to rest. A portion of the foundation of the old "Court House" remained standing until the close of the first quarter of the present century, when the "hand of Progress," alas! destroyed the historic landmark of our fathers forever. Not a mark or sign remains to tell the story of this once-flourishing hamlet. It is believed, however, that the old "Rose and Crown Tavern" was built before the hamlet became extinct, and that for many years before it became the headquarters of Lord Howe, Commander-in-chief of the British forces in America, its parlor was the scene of the County Court. The oldest building standing in this particular vicinity—and who can deny that in is one of the original?—is located about a hundred yards back of the "Black Horse Tavern." It was undoubtedly the home of Margaret Montcrieffe, during the encampment of her father's regiment at New Dorp.

Whether it was impossible to procure a bell at any price, at the time the matter

was mentioned by the Presiding Judge, or whether the economical officials of that period opposed the expenditure of so much money, there is no record to prove. But there is proof that the bell was not purchased then, and the one of which we write was not the first in use on Staten Island. To St. Andrew's Church, at Richmond, must be given that honor. Many years before the Revolution those who worshipped God in that even then old edifice, were called from the solitude of their homes among the wooded hills by a bell which hung suspended from the limb of a huge butternut tree that stood near the entrance to St. Andrew's cemetery, and it was for a time in the "signal service" of Howe's army. It was in charge of Lieutenant-Colonel Simcoe of the "Queen's Rangers," whose headquarters were in the old Red Jail, still standing a few yards from the church.

When, in 1729, it was decided to "abandon ye Court House and Jail at Stoney Brook," and to establish one more in keeping with the progress of the age at Cucklestowne, (Richmond, the present County Seat), those who advocated the movement urged it upon the ground that "there is a bell by ye church in Cucklestowne which could be rung by ye high sheriff, and thus add dignity and respectability to ye court of his majesty ye king of Great Britain, etc." So far as we are aware, this argument, coupled with the fact that "Cucklestowne is located in ye centre of ye Island," broke down all opposition to the movement in favor of "re-mov-ing the County buildings."

The Red Jail was built at Cucklestown in 1710, before the little hamlet was adopted as the County Seat, and there is no proof of the County Court being held there until 1730, when its name was changed to Richmond towne.

The first Court House erected at Richmond was a plain, two-story, shingle-sided building, gable-end to the road, and contained a small Court room, an apartment for the Sheriff and his family, a room for the official records, and the "County Police Headquarters." I was recently shown an original order, issued from this building, and signed by "Christopher Billopp, Chief of Police of Richmond County." This Court House was destroyed by fire during the Revolution, by order of Colonel Simcoe, (who had also made arrangements to destroy every building in the vicinity in case Lafayette should develop sufficient strength to capture Fort Richmond, just back of the village. Many valuable county records were destroyed by this fire, the loss of which frequently causes annoyance and confusion even to this day.

In 1792 the work of re-building the

Court House was commenced. It cost \$997.50, and it took two years to build it. It is generally believed that it was erected on the site of the building destroyed by the British. This Court House was occupied for the first time in October, 1794, when the Board of Supervisors met. The board consisted of the following members: Abraham Burbanck, of Castleton; Cornelius Bedell, of Northfield; Cornelius Cole, of Westfield, and George Barnes, of Southfield. It was not long before the question of purchasing a bell was again agitated; but it took at least two years—probably three—to settle it definitely. Then, at that time, the old Court House Bell, which has been entrusted to our care for preservation, was purchased. It was cast in the foundry, alluded to at the commencement of this article, in 1796. It was placed in an open tower alongside the Court House, and the people thronged the village from every part of the Island to hear it ring for the first time. It was indeed a gala day. Stores were closed and business generally suspended. The dream of more than a century—aye, the proud anticipations of generations—were at last realized! Richmond County owned a Court House bell! The County officials at that time were as follows: County Judge, Gozen Ryerss; Member of Assembly, Lewis Ryerss; County Clerk, John Mersereau; Surrogate, Abraham Bancker; Sheriff, Isaac Cubberly; Supervisors—Abraham Bancker, of Castleton; Daniel Lake, of Northfield; Benjamin Larzelere, of Westfield; and George Barnes, of Southfield.

In 1837, the erection of the present Court House was commenced. The original cost of the structure was \$4,000. The work was done in accordance with a resolution of the Board of Supervisors, and the commissioners and all others, save those who performed manual labor, gave their services to the county. The Supervisors were: Nathan Barrett, of Castleton; Jacob Simouson, of Northfield; Joseph Seguire, of Westfield, and Samuel Coddington, of Southfield. When the Court House was finished the old building was sold at auction to Walter Betts, and was converted into a dwelling. It is now owned and occupied by Mr. Isaac M. Marsh. The bell was then taken out of the tower and placed in the belfry of the new Court House. Shut in by the blinds of the belfry it could scarcely be heard as far away as St. Andrew's Church, and frequently caused great annoyance to those attending Court. Then arose the question of purchasing a larger bell. The people were divided. Many urged the Supervisors to go ahead and make the purchase, while others implored them to be careful how they expended the people's

money! At last, in 1857, the Board of Supervisors met to take definite action. It consisted of Richard Christopher, of Castleton; Garret P. Post, of Northfield; Gilbert A. Cole, of Westfield, and Samuel Barton, of Southfield. Captain Christopher, (who had been a member of the board since 1846, and was known in his early political career, as the "Boy Supervisor"), moved that a committee be appointed to purchase a new Court House bell. The motion was carried, and Captain Christopher was appointed the committee, with power. On the following day he started for the city to make the purchase. He was fearful lest the bell he should select might be too heavy, and then what a storm there would be in Richmond County! The one selected, however, weighed 175 pounds, and he actually dreamed of a large bell crushing down through the roof and ceiling of the new Court House, destroying everything beneath it!

When the new bell was placed into position, Captain Christopher, at a subsequent meeting of the Board of Supervisors, moved that the old bell be sent to the County House, and placed in an open frame tower. This motion met with the unanimous approval of the Supervisors, and for several years it rang out alternate sunshine and shadow to the homeless of the land. Isaac L. Miller was the Keeper in charge of the Alms House when the bell was sent there.

One cold evening in February, 1880, the old bell rang for the last time. "Jack Frost" did his work well. But it was not discovered until on the following morning and then, to the regret of all, broken and useless, it was taken down and placed in the office of the Superintendents of the Poor. From that day forward it has been carefully guarded and preserved by Mr. Thomas McCormack, Keeper of the Alms House, to whom we are under obligations for its existence to-day. It remained there until a few days since, when the writer, on behalf of this Association, applied for its possession, and the Superintendents of the Poor unanimously voted to turn it over to our keeping. It is a valuable historical relic, entitled to the earnest consideration of all who reverence the past, and is well worthy of our care.

On motion of Dr. N. L. Britton it was *Resolved*, That the cordial thanks of this Association be tendered to the Board of Superintendents of the Poor of Richmond County and to Keeper Thomas McCormack, for the valuable historical relic, the old Court House bell, presented by them to the Association through Mr. Ira K. Morris; that Association accepts the gift and assures the donors that it will be given a permanent place in its cabinet.

On motion of Mr. Hollick the Association adjourned to the second Thursday in September.

Sept. 12, 1889

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

THURSDAY, September 12th, 1889.

Informal meeting only, a quorum not being present.

Mr. Charles W. Leng read the following paper:

THE CARABIDÆ OF STATEN ISLAND. PART II.*

THE SPECIES OF PLATYNUS INHABITING STATEN ISLAND.

The genus *Platynus* contains nearly one-tenth of all the Carabidæ of Staten Island, comprising about 20 species of the insects commonly known as the Ground Beetles.

They are from one-quarter to three-quarters of an inch in length and moderately stout, and of the form usually found in the Carabidæ. The head is small, armed with curved and pointed but not very conspicuous mandibles; the thorax is rounded in outline and more or less constricted at base; the elytra are slightly tapering towards the tip, which is rounded, and are sinuate or incurved near the extremity of the outer margin. They bear the usual striæ, impressed longitudinal grooves of variable depth, and between the second and third of these are found the "dorsal punctures" which are sometimes mere dots, such as a needle point might make, and sometimes large and comparatively deep, in which case they are called "foveolate." The legs are long and adapted for running, the tarsi five jointed and armed with terminal claws.

The genus is sharply defined and the collector soon learns to recognize it at sight. In case of doubt the following characters will serve to separate it from allied forms.

1. The dorsal punctures of the elytra.
2. The rounded and sinuate tip of the elytra.
3. The entire upper surface and first three joints of the antennæ are glabrous, i. e., not pubescent or hairy.
4. The eighth stria is distant from the margin.
5. The elytra are destitute of an internal plica.

In no other genus will all these characters be found.

The species of *Platynus* are widely distributed, inhabiting all parts of the Island and a variety of situations, though most commonly found hidden under stones near water. Their habits are not well known, but as their wings are well

developed, giving them a power of flight which they do not exercise during the day, and as they occasionally enter houses at night, they are probably nocturnal, issuing forth at night to attack caterpillars and other soft bodied insects. *P. aeruginosus* has been captured on Long Island, in the early morning by placing leaves and chips in the crotch of fruit trees in the evening, beneath which it will hide during the night. They will exist in captivity for a long time without food and perhaps do not eat a great deal, but what food they do take is of animal character and they must be reckoned beneficial to man.

The larva of our commonest species only has been described. It is a little, flattened creature, unexpectedly small for the beetle into which it transforms, ivory white in color, with each segment gradually darker on top from the tail up to the head and thorax which are nearly or quite black. It is found in the same situation as the imago, under stones beside brooks, etc., and is very voracious, attacking any soft bodied larva with its powerful jaws and destroying it in short order. The pupa stage lasts a few days only and the imago gains its full color very soon.

The most abundant species on Staten Island, as elsewhere, is *P. extensicollis*, a very pretty, graceful creature, with a shining green bronzed back and yellow legs. Along the brook and chain of ponds that drain the Clove Valley there is scarcely a stone but in Spring conceals one or more and at any season a few can be found. When disturbed they will run swiftly away seeking new shelter among the crevices of the rocks. This species is found in similar situations as far West as the Rocky Mountains and looks very homelike to the wandering entomologist. *P. decorus* with his yellow thorax and dark elytra affects the neighborhood of larger bodies of water and is very abundant at Silver Lake. *P. placidus* and *P. reflexus* are oftener found in the woods among damp leaves. In midwinter even, brushing away the snow from heaps of leaves, these beetles will be found frozen quite stiff, but alive, awaiting only warmer days to renew their activity. *P. cupripennis* is quite different and loves the sunny sands of Watchogue, where in the fields it is sometimes abundant, running in the sunlight like Cicindelidæ. The other frequently found species are *sinuatus*, *cincticollis*, *melanarius*, *ferreus* (around the Grassmere ponds), *ruficornis* and *crenistratus*. These

* Part I. was published in the Proceedings for December 13th, 1884.

are mostly found with *extensicollis* but not so abundantly. *P. crenistriatus* is a sort of emigrant, being found on the sea shore, presumably wind driven from New Jersey. The remainder of our species are rare, known only by one or two specimens, each of which have fallen before Mr. Davis or myself.

It is a little curious that such insects as these and other showy Carabidæ have received but little general attention and that of a scarcely complimentary nature. The family can boast of undoubted antiquity, for their fossil forms are found in carboniferous rocks. They are as graceful in form and as beautiful in coloring as any living thing. They are bold and active to a degree, the very lions of the insect world, and not only harmless but extremely useful to us. Through modesty, perhaps, most species conceal themselves a great part of the time, yet many, like *cupripennis*, are conspicuous in the sunlight. But the language of general literature reflects the popular feeling and such lines as Shakespeare's, "Beetles black, approach not near," or "All the charms of Sycorax, toads, beetles, bats, light on you," or even Carlyle's "Poor hobbling beetle," indicate contempt or worse. And I fear the beetle to most means a June bug, making himself unpleasantly at home after nightfall, "the drowsy dör with buzzing wing," as Gilbert White calls it, or "the blundering blockhead of a beetle" that added to Ichabod Crane's nightly terrors.

To help in removing such erroneous impressions I have added to the list of our species such brief notes of their differences as will, I hope, enable the collector to separate them.

The characters used in the description are all obvious except the dorsal punctures which have been described above.

I. Larger species, usually longer than 5-16 inch;

- . . . Thorax yellow, elytra blackish blue, not shining, *decorus*.
- . . . Thorax green, elytra shining purple or cupreous, *cupripennis*.
- . . . Thorax bluish black, elytra black, *placidus*.
- . . . Thorax and elytra green or bronzed, legs yellow, *extensicollis*.
- . . . Thorax and elytra green or bronzed, legs not yellow;
- . . . Elytra with 8 foveolate punctures, legs black, *octopunctatus*.
- . . . Elytra with 6 foveolate punctures, legs black, *excavatus*.
- . . . Elytra with 6 deep punctures, legs brown, *ferreus*.
- . . . Elytra with 10 or 12 punctures, legs brown, *nutans*.
- . . . Thorax and entire insect black except the legs;
- . . . Legs also black;

- . . . Elytra oval with humeral angles completely rounded, *angustatus*.
- . . . Elytra of usual form with humeral angles distinct;
- . . . Side margins of thorax circular in outline, *melanarius*.
- . . . Side margins incurved near base, *sinuatus*.
- . . . Very small and slender, *obsoletus*.
- . . . Legs red, elytral striae strongly punctured, *crenistriatus*.
- . . . Thorax black, side margin very narrow, elytra slightly bronzed, *punctiformis*.
- . . . Thorax pitchy brown with yellowish reflexed margin, elytra pitchy black;
- . . . Hind angles of thorax more distinct, margin wider, *reflexus*.
- . . . Hind angles of thorax less distinct, margin narrower, *cincticollis*.
- II. Smaller species, usually under 5-16 inch long;
- . . . Entirely black, elytra with 6 dorsal punctures, *obsoletus*.
- . . . Black except yellowish legs and pale antennae, 8 to 12 punctures, *ruficornis*.
- . . . Color mostly yellowish brown, *tubulentus*.
- . . . Color variable, elytra not sinuate and strongly punctured, *pusillus*.

Mr. Arthur Hollick stated that the recent severe storm had driven hundreds of shore birds on to the meadows near South Beach, where gunners were killing them in large numbers. On September 11th, when he visited the Beach, several sportsmen had brought in one or two hundred each. The birds included Winter Snipe, Jack Snipe and a few Yellow Legs. Flocks of gulls were also to be seen hovering over the meadows, and information was received in regard to other birds having been either killed or seen, which had not been noted in the vicinity for years.

Attention was called to the death of Mr. William Chorlton, one of the earliest members of the Association who died at New Brighton on the 20th of August in the seventy-eighth year of his age. He came from Lancaster, England, when a young man, and was known as a skilful horticulturist. *The American Grape Growers' Guide*, published in 1856, and written on Staten Island, was Mr. Chorlton's largest work, but he was also the author of many articles on kindred subjects, mostly contributions to agricultural or horticultural journals. Of late years while residing on Staten Island he pursued horticulture as a pleasure and also made trips from time to time to Florida.

The printed index to Vol. I. of the Proceedings was presented, copies of which will be distributed with the current proceedings.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN* ISLAND.

THURSDAY, *October 10th*, 1889.

Meeting called to order at 8.30 o'clock.
Dr. N. L. Britton elected chairman *pro tem*.

Messrs. John J. Kenney, Hubbard R. Yetman, Walter T. Elliott, W. A. Hervey, Geo. Babcock and J. C. Thompson were elected active members.

The building committee reported that a few personal appeals had been made and \$850.00 had been pledged at date towards a building fund. It recommended that provision be made for "patrons in perpetuity," for all who contribute \$100 00 or more at any one time, and "life members" for all who contribute \$50.00 at any one time. It was also recommended that a public appeal be prepared, setting forth the object and aims of the Association. In order to carry out the above recommendations two amendments to the Constitution will be necessary.

On motion the report of the committee was accepted, and the entire subject will come up for final action at the Annual Meeting in November, when the necessary amendments to the Constitution will be acted on.

Mr. Wm. T. Davis read the following additional notes in regard to butternut trees on the Island:

In addition to the butternut trees growing along Sandy Brook, mentioned in the Proceedings of April 11th, 1889, a single large tree was discovered during the past Summer on a sand dune, near the Rossville Road. 'Mid the surrounding pines, wild cherries, etc., many little trees, seedlings from this one, are springing up, and if they are not destroyed by fire, there will probably soon be a considerable grove of them on this part of the Island. The dune is some distance to the west of the little swamp where Sandy Brook rises and is nearly a mile from the trees previously reported. Mr. Wm. S. Page has informed me that trees of this species grew on the Vail place, near the

bluff at Prince's Bay, and not far from Lemon Creek. A glance at the map will show, from the localities given, that the trees extend in a belt across the Island, from North to South, following in a general way the direction of Sandy Brook.

Mr. Ira K. Morris showed a pencil sketch of the old Rose and Crown Tavern, taken from a woodcut published in *The Little Corporal*, September 24th, 1853.

Mr. George J. Hicks showed a set of five sparrow hawk's eggs, found last May, on Todt Hill, by Spire Pitou, George W. Jewett and J. J. Hicks. The nest was in a hollow tree, almost thirty feet from the ground. In the same tree were nests of the red headed woodpecker and high holder. This is the first recorded instance of the nest of this bird having been found on the Island.

Mr. James Raymond presented a large stone axe, skin scraper and several arrow heads from Totteville.

Mr. Arthur Hollick showed fossils, mostly corals, found in the yellow gravel overlying the limonite ore on Todt Hill. Also a pellicle of a black snake. The snake had not quite cast it off when discovered. In its efforts to escape about half an inch of the end of the tail was torn off, otherwise the cast was perfect. It was found near the old fort on Richmond Hill, and two others were lying immediately alongside it.

Dr. Britton remarked that an outcrop of Cretaceous clay had been recently reported at the foot of Eltingville road, and Mr. Hollick stated that recent excavations near the railroad trestle beyond Arlington station had exposed Triassic shale in considerable quantity and that the locality would probably repay careful examination. Other exposures of this formation, at Mariners' Harbor and Erastina, were described in the Proceedings for April 11th, 1889.

A list of the fungi in the cabinet of the Association, named by Mr. J. B. Ellis, of Newfield, N. J., was presented, which will be published as a special.

Adjournment at 9.45 o'clock.

1710-1711

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION OF STATEN ISLAND.

THURSDAY, *November 14th*, 1889.

Meeting called to order at 8.30 o'clock.

In the absence of the president, Dr. N. L. Britton was elected chairman *pro tem*

The secretary stated that no meeting was held on the night of the annual meeting, on account of the absence of the necessary quorum, and in consequence the president had called a special meeting for this evening.

The building fund committee reported that the first \$1,000 in pledged subscriptions had been passed—two additional \$100 having been pledged since last meeting. The committee was continued with power to prepare and issue a statement and appeal to the public. Amendments to the constitution were voted, providing for life members and patrons at \$50 and \$100 respectively

Reports of officers for the past year were presented and accepted as follows: The treasurer reported an income of \$155.18; expenses, \$99.10; leaving a balance of \$56.08 in the treasury, all debts paid and no back dues outstanding.

The recording secretary reported 39 members on the roll of active membership

The curator reported 46 additions to the collections and 29 to the library.

The corresponding secretary gave an abstract of the communications received and transmitted during the year, also quotations from and comments upon the work of the Association from various scientific periodicals. The publication and distribution of the Index to Vol. I of the Proceedings had resulted in a large increase in the number of exchanges with other scientific societies, and had received very gratifying notice.

Thomas Craig was elected an active member.

The following officers were elected for the ensuing year: President, Dr. N. L. Britton; Recording Secretary, Chas. F. Simons; Corresponding Secretary, Arthur Hollick; Treasurer, Eberhard Faber; Curator, J. C. Thompson.

Mr. Arthur Hollick stated that his attention had recently been called to some interesting facts in regard to statistical computations respecting the probable population of the village.

In the recent suit by the S. I. Water Supply Co. against the Village it became necessary to obtain a census of the inhabitants of the village for the year 1888, and the following methods of calculation were adopted. The last official census was that of 1880, which, with the previous ones, was as follows:

1860.....	6,778	1870.....	9,504
1865.....	7,683	1875.....	10,957
1880.....	12,679		

Now from calculation from these figures we find that the increase for each semi-decade is:

1860-65....	905	1870-75.....	1,453
1865-70.....	1,821	1875-80.....	1,722

Which is an annual increase during each year as follows:

1860-65.....	181	1870-75....	291
1865-70.....	364	1875-80.....	344

Or, calculated to percentage of annual increase, we have:

1860-65.....	2.67	1870-75.....	3.062
1865-70.....	4.738	1875-80.....	3.149

Which gives an average annual increase of 3.405 per cent. for the whole period.

Now suppose we take the population of 1880, which was 12,679, and apply this rate of annual increase for the succeeding years. It is not necessary to here give all the items of calculation, but anyone can readily satisfy himself that in the year

1888 this basis will give a population of 16,354.

Now the vote for presidential electors in 1880 was 2,644, which gives 4.795 persons to each voter. In 1888 the vote was 3,355, and assuming that the ratio between the voters and the whole population is the same as in the year 1880 our population is 16,087.

Again, the number of houses on the assessment roll in 1880 was 1,809, which gives 7.03 persons to each house. In 1888 the number of houses was 2,266. Assuming the same number of persons to each house as in 1880 and we have a population of 15,923.

Finally an actual house to house enumeration of the inhabitants was made by our friend Mr. Geo. W. Wright, on behalf of the Water Supply Co., and 15,980 was the figure obtained.

Tabulated, the results will appear :

Calculated from average annual increase, according to previous census enumerations.....	16,354
Calculated from voting population	16,087
Calculated from increase in number of houses.....	15,923

Actual enumeration..... 15,980

Next year the official census will again be at our disposal, and it will be a matter of considerable interest to determine which basis of calculation is the most accurate and the most likely to lead to correct results.

Apple blossoms were shown, picked during the present week, and the fact was noted that pear trees had blossomed so universally throughout the Island during the past three months as almost to have ceased exciting attention. A horse chestnut and a few branches of a silver maple are in blossom near St. George, at the present time, and *Forsythia*, Japan quince, Missouri currant, lilacs and other garden shrubs have blossomed more or less freely a second time. The growth of *Protococcus* has been extraordinary everywhere. It is unusually conspicuous on our trees and fences, and in New York many of the brown stone houses facing north appear as if they had received a coat of green paint. The almost constant wet weather since early summer was quoted as the probable cause of these phenomena.

Adjournment at 10 o'clock.

May 12 1857

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION OF STATEN ISLAND.

December 12, 1889.

Meeting called to order at 8 20 o'clock.
The following paper, by Mr. Chas. W. Leng, was read by the corresponding secretary:

THE CARABIDÆ OF STATEN ISLAND.

PART III. *

THE LEBIINI AND ALLIED FORMS.

The apical margin of the elytra varies considerably in form among the Carabidæ, being in some simply rounded in outline, in others sinuate, or with a bend in its curve, or as in the small group under consideration, more or less truncate, that is cut squarely off. The shape varies in the different species, but in all is sufficiently distinct from the usual type to at once distinguish a member of the group.

Many of the species are exceedingly local in their habit and our list is much shorter than we could wish, but as several years have now passed without any increase, it may be taken to represent our common forms at least.

The following table will serve to separate the species:

Neck very elongate; colors yellow and black. *Casnonia Pennsylvanica*

Neck moderately elongate; colors yellow and blue, hairy. *Galerita Janus*.

Neck short as usual (true Lebiini)

Elytra blue; head and thorax yellow:
Larger; elytra deeply striate.

Lebia grandis.

Smaller; elytra finely striate.

L. atriventris.

Elytra blue, thorax yellow, head bluish black. *L. tricolor*.

Elytra, head and thorax green.

L. viridis.

Elytra, head and thorax olivaceous.

L. pumicea.

Elytra dark brown with large yellow spots; head and thorax black, margins yellow. *L. ornata*.

Elytra yellow with black stripes.

L. vittata.

Elytra, head and thorax black.

Metabletus Americanus.

Above dark brown, except side margin of thorax, usually translucent and the humeral angle of elytra usually testaceous:

Elytra deeply striate, 4th joint of tarsi entire. *Dromius piceus*.

Elytra finely striate, 4th joint of tarsi emarginate; glabrous

Elytra uniform brown!

Pinacodera platycollis.

Elytra with usual testaceous humeral spot. *P. limbata*.

Basal margin of thorax widely reflexed and very squarely truncate. *Plochionus timidus*.

Elytra coarsely punctured and upper surface hairy;

Elytra entirely black, with metallic or bluish lustre.

Cymindi pilosa

Elytra with usual humeral spot testaceous *C. Americana*.

Elytra mostly testaceous.

C. neglecta.

The first two species are not true Lebiini, but having the elytra moderately truncate might be sought here, and the elongate neck furnishes a ready means of identifying them. They are both abundant under stones in the woods from early Spring throughout the year, and *Casnonia* also frequents gardens, where it is often found under heaps of leaves, weeds, &c., conspicuous by its yellow, black-spotted elytra, and long, shining black neck.

Lebia grandis has been considered a special enemy of the potato beetle (*Doryphora 10 lineata*), and it has accompanied

* For Parts I. and II. see Proceedings for Dec. 13, 1884, and Sept. 12, 1889.

that pest in its migration from the West. Dr. Horn, in 1872, gave its locality as Texas and Nebraska, and when I first collected it was reckoned a rare beetle. Now it is commonly found under stones in the Spring and in various localities in Summer, often associated with *atriventris*.

L. tricolor is known by one specimen in the collection of Mr. W. T. Davis.

The remaining species of *Lebia* have generally been taken by sweeping or brushing a strong net through weeds, small bushes or grass. *L. viridis* is the most abundant and may often be seen, a bright, shining green insect, devouring the plant lice that infest some tall growing weeds. It is extremely active and flies readily. The others, *L. pumila*, *ornata* and *vittata* are quite rare in our experience, though more abundant in other sections. Possibly beating in the twilight, when many Carabidæ feed, might produce good results.

Metabletus Americanus has been taken by Mr. Davis, but we have no record of its habits; probably they are similar to those of the *Lebiae* to which it is closely allied.

The species of *Dromius*, *Plochionus* and *Pinacodera* seem to inhabit larger trees and their flattened form and nondescript brownish color, resembling the bark in the crevices of which they lurk, indicate a special adaptation to their walk of life. The brighter colored *Lebiae* are found in the sunlight and among green leaves and gayly painted flowers where their colors are inconspicuous, while these brown and pitchy cousins are to be sought by jarring overhead branches and the denser shaded thickets. The protective mimicry of color is abundantly illustrated among the Coleoptera, but nowhere more markedly than in these *Lebiini*.

The species so far named are spread over the Island quite uniformly, but the last three species on our list are peculiarly natives of Bloodroot Valley (Black Horse Ravine.) Dr. Hamilton has noted in the vicinity of Pittsburgh that certain species

retreat before the advance of civilization and in such thickly settled neighborhoods as his make their last stand in some isolated and wild piece of woodland. "This crooked and shady ravine," with its "steep hill sides decked in Spring with the dainty Bloodroot blossoms" seems to me such a spot. There still live the larger species of *Pterostichus*, the very beetles that caused the Doctor's remark, and there have been found these three species of *Cymindis*, the last *C. neglecta* being otherwise unknown around New York. Though not the most striking at a first glance, they are really among the most beautiful of Carabidæ, the upper surface shining blue or golden testaceous, wrought with raised lines and indented punctures, while over all is spread a fine pubescence that adorns but does not conceal the workmanship. They are too active to be often captured in Summer, but at this season and in the depth of Winter they may be taken in their hibernating homes. Many of the trees have fallen and lain until, under the sound bark, the wood is turned almost to powder in which, quite snug and warm, the *Cymindis* are sleeping under the snow.

I am indebted to Mr. Davis for specimens of *Plochionus* and *Dromius* and to Mr. J. C. Thompson for *Metabletus Americanus*.

The corresponding secretary read by title a paper by Mr. Wm. T. Davis, upon the homestead graves of the Island, which will be issued as a special number of the Proceedings

Mr. Jos. Thompson showed *Cecropia* cocoons which had been eaten by field mice.

Mr. Arthur Hollick showed specimens of wheat in which the grains had all sprouted while in the ear. The specimens were from stacks in a field on the Vanderbilt farm at New Dorp—the grain in all the stacks was in the same condition—due to the phenomenal wet season.

Adjournment at 9.45 o'clock.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION OF STATEN ISLAND.

Special No. 9.

December, 1889.

THE FOLLOWING PAPER IS REPUBLISHED BY SPECIAL REQUEST.

HOMESTEAD GRAVES.

BY WILLIAM T. DAVIS.

PART FIRST.

A ramblor on Staten Island is sure to find a number of family burying grounds, some of them containing many stones, and others only three or four, and these often hidden mid over grown tangle that their discovery is quite an accident. A little clump of trees in some upland meadow, or a patch of high weeds left in a plowed field, is generally passed by in a summer without a thought or suspicion as to what they hide; but when the leaves have fallen the unscreened grave stones show more plainly, and the neglected corner tells its secret.

Such places have a particularly human interest, and it is no wonder that that embodiment of local wisdom concerning topography, &c., the bright eyed small boy, should know of all the burying grounds for a long way about his home. He is quite unsuspecting, stopped by a stranger in the woods and asked concerning graves. "Does he know of any?" "There are some on the hill," and as soon as the stranger turns away, he calls, "getap" to the cow, and both go tumbling through the bushes, for isn't he "wanted home." In this way I have heard several times over of every little grave yard mentioned, though there is no doubt that there are others to be found.

If the reader discovers the names of some of his relatives, or even finds that the inscription with all its quaint verse, inscribed on the old brown stone, erected in the memory of his grand-father, is here reproduced, he must bear in mind that it is not done in that spirit which prompts the youth of one generation to smile at

the ways and expressions of their ancestors. In the local history we read of Daniel Lake, of Albert Journeay, of Abraham Cole and Hannah his wife, of their last will and testament, and how many children they left property to, but in no church yard are there any stones erected to their memories, and only in some stray corner of a farm, in nearly every case now sold to strangers, are these records to be found. A true copy of them will grow in interest as it grows in years.

There are no very old tomb stones on Staten Island, for the graves of the first settlers were marked by uninscribed slabs, such as could be found in the adjacent fields. The present owners of the land, or neighbors, are occasionally seized with that desire for "reform and change," extending it even to these lichen covered stones, which they think, no doubt, have been erected "in memory" quite long enough. So those that have toppled over and those that are standing are gathered together in a neat pile and sometimes the front door is improved by having a smooth flat slab laid in front of it. The giant box plant by the door, or the old pear tree in the garden, may be a more enduring monument than the grave yard stone.

The oldest private burying ground, that I have been able to find, is situated in a little grove of trees on a gently sloping hill side near the shore at Prince's Bay, and the oldest stone bears this inscription.

Here lies ye body of Winance, son of matthias & Cartwright Johnson, died March ye 16th, 1734, aged 2 years, 7 mo & 19 days.

The cherubim's head, with its crown, curls and wings, instead of being at the top of the stone above the inscription as is usual, is below it and the back of the slab is beveled along the edges. A cedar tree

has grown up just behind it and bids fair,
some day to cause its fall.

Next to the monument of Winance, is
one bearing the following inscription:

Here Lyes ye Body of Mrs Charity, wife of Mr
Mathias Johnson, who Departed this Life Sepr ye
16th 1751, In ye 57 year of her age.

Above the inscription is a skull with
wings.

Separated from the above and standing
side by side, are two small brown stones.

In Memory of Mary, Daughter of Joseph & Cath-
arine Taylor, who departed this life June 12th 1791,
aged 7 months & 15 days.

In Memory of Edward, son of Joseph & Catharine
Taylor, who departed this life Sepr 17, 1790, aged
2 years, 6 months & 25 days.

Behind those just mentioned is a row of
seven stones, all with their backs to the
graves. Commencing with the one near-
est the bay, they bear the following in-
scriptions:

In Memory of Augustus Dubois, the son of Lues
and Ann Dubois, departed this life Sept 14th 1807,
aged 54 years and 5 months.

Our Children at this tomb appears
Bathed with grief half drowned in tears
Ah! go you home for us dont weep
Beneath this mouldering sod we sleep
Prepare for death you plainly see
You'll be entombed as well as we.

In Memory of Tabithy Androvot, daughter of
John & Zipporah Androvot, and wife of Augustus
Dubois, who departed this life March 31st 1815,
aged 58 years, 5 months.

Ye mourners who in silent gloom
Bear your dear Kindred to the tomb;
Weep not for me my children dear,
I am not dead but sleeping here;
The debt is paid my grave you see
Prepare for death & follow me.

In Memory of Rebecca Parlee, wife of Henry
Parlee; who departed this life October 23rd 1813,
Aged 60 years, 11 months and 13 Days.

In Memory of Ann, Wife of William Lakerman,
who departed this life November 7th 1816, aged 66
years.

In memory of Rebecca, wife of John Gunton,
who departed this life 1st of Octr, 1820, Aged 25
Years, 10 Months and 26 Days.

Tho' Earth receives within her bed,
And numbers with the silent dead,
The fairest form & purest heart
That death from fondest friends could part.

Tho' Husband, Mother, Kindred mourn
The Dust that sleeps beneath this stone
Tho' Beauty, Virtue, could not save
The Wife, the mother from the grave.
Still long as memory can live
The thoughts of her shall pleasure give;

And tho' her body body buried lies
Her soul will triumph in the skies.

Sacred to the memory of John Dubois, son of
Augustus and Tabithy Dubois, who departed this
life October 25 1821, in the 41st year of his age.

My flesh shall slumber in the ground
Till the last trumpets Joyful sound
Then burst the chains with sweet surprise
And in my Saviours image rise

Sacred to the memory of Wallace Bates, son of
Leander & Susan Green, who died November 12th
1823, aged 3 years, 1 month and 18 days.

Beloved child!
your parents mourn thy loss,
and o'er thy tomb
drop the silent tear of filial affection.
Sacred to thy memory.

Alone and near the line fence is a little
brown stone.

In memory of David Cole, who departed this life
Sept 10th 1801, in the 25 year of his age.

With the exception of the babe, Mary
Taylor, who died in June, the other
deaths occurred either in the Fall months
or in March, and it was here literally true
that Autumn days were "the saddest of
the year." September had four deaths,
October three, November two, and March
two.

The remaining stone in the plot is a
white marble slab to the memory of Luke
Fay, a native of Ireland, and to his two
sons, Luke Fay, Jr., and Thomas. The
slab has been removed from its original
position and now rests on its side. Like
John Wilson's grave in "The Midnight
Cry," it was once surrounded by a neat
white fence and like his also, it could be
seen from the parlor window. There are
a few small willows near the plot and
poison ivy has taken possession of what
now remains of the fence posts.

In the field near the old stone house,
the "Manor of Bentley," Thomas Billopp
and his wife were buried. The stones
have been removed; one lies broken just
inside the fence by the public highway
and the other stands in the road leaning
against the rails. Their inscriptions read:

Here lies ye body of Thomas Billopp, Esq., ye son
of Thomas Farmer, Esq., dec'd August ye 2d 1750
in ye 39th year of his age.

Here lies ye body of Evjenea, ye wife of Thomas
Billopp, aged 23 years, dec'd March ye 22d, 1735.

On a little piece of rising ground on the
waterside of the Fresh Kill road, at
Rossville, are a number of stones bearing

familiar Staten Island names. It is not strictly a family burying ground, though about one half of the monuments are erected in memory of Seguines. This cleaving to the home acre is one of the most interesting facts gleaned from a study of the local burying grounds. So many of the Seguines, the Parlees, the Poillons and the Journeays, all Huguenot families, lay buried on the western half of the Island, while the Lockmans, Burbanks and Van Cliefs, whose ancestors originally came from Holland, are interred on the Eastern half. The stones bearing English names are not so locally confined, but occur with the others. A glance at a map showing the property owners, will also prove how generally true is this localization even to-day.

The following inscriptions occur on some of the oldest stones in the Rossville burying ground:

Here Lyes The Body of Abram Parlee, Born Jan'y 10th 1716, & Departed This Life November the 2d 1760, Aged 44 yrs & 9 months & 23 days.

Here Lyes The Body of John Parlee, Born March 27th Day 1743 And Departed This Life Jan 2d 1761 Aged 17 Years, 9 Months and 6 Days.

Here Lyes ye Body of Abram Cole, Aged 39 years, 1 mo. Decd Sept ye 22d, 1751.

In Memory of Susannah, wife of John Marshal who departed this life October 2nd, in the year 1801 and in the 89 of her age.

My flesh here slumbers in the ground
Till the last trumpets joyful sound
Then burst the chains with sweet surprise
And in my Saviours image rise.

here Lyeth the Body of Jacob, son of handrick Slaght, who departed this life June the 20th, 1751 Aged 26 years.

In memory of Hitchia Simonson, who died July the 25th 1780, In the 67 Year of her Age.

A child and grand children may deplore
The loss of her that is no more
Her frugal hands no more provide
We trust she rests at Jesus side.

Catherine Marshal was Born Octor 30, 1757 & Died March 18th 1782.

In memory of Bornt Parlee, who died Jan. 20, 1825 in the 72 year of his age.

Father rest in peace.

In Memory of Susannah Seguine, who departed this life the 31st Day of May, 1804, aged 34 years, 9 Months and 4 Days.

Both few & ill the days of man
Away do quickly pass
Just as a hand breadth or a span
All flesh is like the grass.

In Memory of John Seguine, born Noyember the 15th 1757, departed this Life the 6 of October 1818, aged 55 Years, 10 Months and 21 Days.

affliction sore six weeks I bore
Physicians were in vain
Till God alone did hear my moan
And eased me of my pain.

Sacred to the memory of Israel Oakley, who died Dec 10, 1824, in the 85th Year of his age.

In memory of Elizabeth, wife of Israel Oakley, who died Jan'y 1st 1819, in the 76 year of her age.

Affliction sore five years I bore
Physicians were in vain
Till God alone did hear my moan
And ease me of my pain.

Israel Oakley lived at the time of the Revolution on Long Island, and the Tories hearing that he had sold his farm visited the house one day and demanded the bag of money. Their approach was observed, however, and one of the daughters ran out of the back door into the woods with the treasure. So when the marauders arrived and demanded of the girl "Sal" that the money be given up, she said that there was none in the house, whereupon they slapped her face. They stole a dollar out of Elizabeth Oakley's pocket, and took the silver buckles from Israel Oakley's shoes, casting him puter ones, with the remark, that a "fair exchange was no robbery." He was then set adrift in a boat with only a paddle, and the Tories departed.

Under a few small trees in a field, on Journey avenue, are three graves.

Here lye's ye Body of Paul Micaux, Aged 51 years. Decd Augt ye 6, 1751.

In Memory of Mary Poillon, who departed this life Oct XXI, 1789 in the LX Year of her Age.

Here lies ye Body of Martha, Wife of John Mersereau, deced November 21 day, 1751, Aged 23 y.

Both old And Young As Well As Me
Must In due time be buried Bee, Under
this Body of Cold Clay Just In My
Prime And called A Way.

The first of these stones bears a skull over the inscription, the second a sunrise, and the third a head with wide staring eyes that do not look quite divine. The last stone has fallen somewhat backward and the inscription is now so weather-worn and covered with lichens as to be scarcely legible.

Across the road, on what was once the Journey farm, is a little plot neatly fenced about with the modern galvanized

wire, only it is without the barbes. The ten stones are inscribed as follows :

Sacred to the Memory of Mr Daniel Stillwell, who departed this Life the 20th of May 1760, aged 58 years.

The Voice said cry & he said
what shall I cry ? all flesh is
grass; the grass withereth
the flower fadeth but the
word of our God shall
stand forever. Isa, 40 v 6 & 7

This stone is particularly interesting, for the reason that it is of a dark blue slate, and it has held the inscription and cherubim's head wonderfully well.

In Memory of Edward P. Journeay, Son of Albert and Mary Journeay, who departed this life the 11 day of April in the Year of our Lord 1796, aged 10 years.

Sacred to the Memory of Martha, widow of David Fitz Randolph, who departed this life 9th Nov. 1810, aged 57 years, 3 mos & 8 days.

She has finished her course in faith
And now rests from her labours.

Abert Journeay, Born March 8 1755 Died July 24 1845.

They pass away these men of many years
As Autumn's sheaves before the reapers hand
Their dim eyes closing on this vale of tears
To wake unclouded in the better land.

Sacred to the memory of Mary, wife of Albert Journeay, who departed this life December 27, 1842, in the 88 year of her age.

And is it that body cold in death
That form we loved so well
And has she drawn her latest breath
And gone in Heaven to dwell.

They who die in Christ are blest
Sweetly with their god they rest
All their toils and troubles leaving
So be ours the faith that saveth.

In Memory of Moses Pearson, who departed this life 25 August, 1816, aged 48 years & 15 days.

In Memory of Widow, Phebe Furman, who departed this life, 10 December 1816, Aged 50 years, 3 months and 20 days.

Sacred to the memory of James Journeay, who departed this life July 16, 1829 aged 40 years & 11 months.

Though deep the slumbers of the tomb
Though dark this bed of clay
Yet shall he wake & live again
In everlasting day

In memory of Joseph Journeay, who departed this life the 14 of May, 1821, Aged 39 Years and 6 months.

The cutting of this stone is quite elaborate. The words are mostly curved and the scrip letters offered an opportunity for flourishing that has not been neglected.

In Memory of Catharine Hedden, who departed this life, July 9, 1805, Aged 86 Years, 9 months & 18 days.

Behold all you that do pass by
As you are now so once was I
As I am now so you must be
Prepare for death & follow me.

PART SECOND.

There is no more dreamy spot on Staten Island, no place that has more of an old time appearance than the stretch of shore and immediate upland that extends from Kreischerville to Rossville. The meadow grass reaches to the water's edge in many places, and some headlands and bluffs make the trend of the shore winding and diversified. Mid these low sandy hills, which seem to lend an extra charm to an Indian Summer day, because they are so warm, nestle a few homesteads, and near them are often the graves of their former owners. Close to one of these old houses and under some orchard trees, by the garden, stand a row of the most elaborately carved brown stones that I have found. Hearts, crossess, heads and various patterns in leaf and scroll are neatly cut and the inscriptions are well preserved. Indeed if a fine crystalline brown stone has been used the lettering is much more permanent than on the marble ones, or on such marble as was used at that time.

In Memory of Leah, wife of John Androvot, who departed this life May 14, 1785, aged 83 years, and 19 Days.

In Memory of Mary, Wife of Asher Tappen, who Departed this life March 22d, 1773, in the 47 year of her Age.

In Memory of Mary Ellis, wife of Garret Ellis, who departed this life Dec 23d 1844, aged 76 years, 10 months and 25 days.

In memory of Garret Elless, who departed this life Oct 31, 1827 aged 71 years 4 months and 7 days.

Prepare to meet thy God.

H. Osborn.

H. Osborn, who inscribes his name on this monument, lettered many others on the Island, and his work always wears well, for he cut deep as well as neatly, and used a good quality of brown stone.

In memory of Leah, wife of Abraham Tappen who deceased Decr 27th, in the 81 year of her age.

In memory of Abraham, son of Mary and Garret Elless, who deceased Oct 2nd 1801, In the 13 year of his age.

In bloom of life I bid farewell

To parents friends and all

And Willingly Resign'd my breath

When Jesus did me Call.

In memory of Magdalane, wife of Henry Butler, who died Aug 3d 1814, Aged 22 years, 8 Mos & 27 days.

Farewell my brethren all farewell

I leave you with the Lord
O may you shun the paths of hell
By cleaving to his word.

Sarah Ann, daughter of Garret & Mary Elless died Sepr. 12th 1817, aged 14 years 2 mos & 2 days.

This lovely bud so young and fair
Call'd hence by early doom
Just came to show how sweet a flow'r
In paradise would bloom.

In Memory of Sebastian Ellis, who was drowned the evening of April the 6, 1822, aged 21 years, 5 months & 9 days.

A youth who great was beloved
For virtues he possessed
And now whilst dead his soul we trust.
In heaven above doth rest.

In Memory of Mary Ellis, wife of James Johnson, who died August the 14, 1822, Aged 27 years, 8 Months & 28 days.

A lingering illness she did bear
With patience firm and true
Till Jesus did her spirit take
To rest with him above.

In Memory of Lany E. Johnston, Daughter of James and Mary Johnston, who departed this life Oct the 11th 1826, Aged 11 years, 10 months, 23 days.

far from this World of cares and
strife now present with the
Lord the labours of the mortal
life end in a large reward.

Sitting in the sun, copying these epitaphs, I could hear the murmur of voices in the house near by, and I fell to picturing the days of September, 1817, when Sarah's mother coming to the door would see her daughter's grave. Was it well that these stones should be so near the house? It was hard to say; sometimes they might make the grief too lasting and sometimes they might curb and soften an unkind nature.

With'n a few feet of this ground, but on the other side of the division fence, are a few more graves. Some little oaks and a dead locust tree covered with poison ivy, stand among the stones, and the tangle is so dense in places that I was obliged to creep under the bushes in order to read the inscriptions.

Peter W. Son of Charles & Ann Du Bois, who died May the 9, 1790, in the 12 year of his age.

Cut by H. Osborn

In Memory of Ann, wife of Charles Du Bois, who deceas'd March the 10, 1783, in the 21st Year of her Age.

H. O.

In Memory of Peter, Son of Daniel Winant, who departed this life June ye 12, 1793, in the 39 Year of his Age.

Between this and the next stone is a small one about a foot high, without any inscription.

In memory of Daniel Winant, who decess'd Jan 23d 1801, in the 72d year of his age.

In Memory of Rebecca, daughr of Daniel & Rachel Winant & wife of Jacob Mercereau, who died May 12, 1797, in the 33d year of her age.

Affliction sore long time I bore
Physicians were in vain
Till God above out of his love
Did ease me of my pain.

In Memory of Jacob Mercereau, who departed this life March 27, 1812, Aged 55 years, 1 month and 16 Days.

Further along the shore, under the shade of some large cedar trees, and near the line fence are three stones, with their backs to the Kill. Near by is a long, low stone house, one story and attic, and with sloping roof. The prickly pear is plentiful under the cedars, and near the graves with the branches hanging over, is an apple tree, probably a seedling. The fruit is quite fine and red, the inside particularly white and snowy. The apples lay thick on the ground, perhaps for the reason, as an old lady laughingly confessed to me concerning some grave yard cherries, that they did not like to eat them. However, I found the apples good; they did not disturb any ancestral superstitions, though not so friendly to the enamel on my teeth.

The stones bear these inscriptions :

In memory of Winant Morgan, who died decemr 10th 1806, aged 2 mons & 10 days.

Beneath this tomb an infant lies
To earth whose body's lent
Hereafter shall more glorious rise
But not more innocent.

Saered to the memory of Mary, wife of Winant Winant, who departed this life March 11, 1847, Aged 82 years, 8 months and 6 days.

Her flesh shall slumber in the ground
Till the last trumpets joyful sound
Then burst the chains with sweet surprise
And in her Saviour's image rise

In memory of Capt. Winant Winants, who decess'd July 9th 1804, in the 60th year of his age.

Though I am parted from you all
Yet hear your fathers voice
Children accept your Saviours call
And make your God your choice.

H. O.

Interesting in connection with this inscription, is a sentence which occurs in the history of the county. "The father

of Abraham was Winant Winant, who made his will July 5, 1804, which was proved August 11, 1804, between which dates he must have died." The name is printed Winant Winant in the history; but it is Winant Winants on the grave stone, though the one next to it says that Mary was wife of Winant Winant. Another Capt. Winant Winant, who died in 1872, is buried in the little cemetery at Rossville.* According to history Peter Winant lived to be 104 years old.

In this burying ground, as in nearly all of the others mentioned, there are some graves marked by common stones.

Two more grave stones, to the memory of Winants, stand near the old house on the sloping hill side opposite the Woodrow church. They are side by side and close to the stone wall. 64

Mary Jane, daugh'r of Peter and Mary Winant, died Oct'r 13th, 1809, aged 16 years, 5 mon's and 23 days.

Farewell vain world am going home
My saviour smiles and bid me come. 65

In memory of Esther Ann, daugh'r of Peter and Mary Winant, who died, July 19, 1824, aged 27 years, 9 months and 18 days.

Now she has dropt her cumbrous clay
And joyful soars the shining way.
She sees with joy her savours face
And sings the triumph of his grace.

Further along the Kill, and nearer to Richmond than the grave stones under the cedars, just referred to, stood the Morgan mansion and many members of the family are buried in a plot near the present house. A short distance away are the foundation stones of what was probably the original dwelling, and as in so many other cases where the first settlers lived we find the largest trees. The biggest cedars grow near the Billopp house, in the Winant burying ground already spoken of, and on the Old Town road is one 8 feet 5 inches in circumference; and here on this Morgan farm, are several of the largest oaks and by the foundation stones referred to, probably the biggest button wood tree on the Island.

A red maple has been planted in the

* The various modes of spelling some familiar Staten Island names is well exhibited in this same cemetery where in a row stand tomb stones to the memory of either a Slaght, Sleight or a Slaight.

centie of the burying plot, and smilax vines and little trees have come up all around, so that the grave stones are completely screened in Summer. With the exception of two Morgan children, on whose little brown tomb stones there is no date of death, the following is a complete record of the inscriptions.

In memory of Jesse Morgan, sen, who died Jan 31, 1813 aged 80 years, 1 mo & 28 d's.

To see a pilgrim as he dies
With glory in his view
To heaven he hath his longing eyes
And bids this world adieu
While friends are weeping all around
And loth to let him go
He shouts with his expiring breath
And leaves them all below.

This stone is of white marble and so weather worn that the inscription is made out with difficulty. At its top is a weeping willow, as there is on the next.

Catherine, wife of Jesse Morgan, departed this life March 5, 1849, Aged 87 years, 3 months and 20 days.

Her end was peace.

In memory of Elizabeth Hill, Daughter of Jesse and Catherine Morgan, who died Sept 25th 1828, aged 38 years & 9 days.

Fond affection rears this humble tribute of respect to the remains of an affectionate Daughter.

Here lieth the body of Deborah Morgan, who departed this life December the 17th 1804, aged 77 years.

Press'd by the hand of sore disease
In pain I wandered on
Till God my Saviour armed with love
In mercy called me home.

In memory of James Morgan, who departed this life, February the 21, 1802, aged 36 years and 1 day.

Affliction sore with patience he bore
Physicians were in vain
Till God alone did hear his moan
And eased him of his pain.

In memory of John, son of James and Mary Morgan, who departed this life June 11th 1806, aged 14 years and 9 days.

In memory of David Morgan, who died Nov 4, 1832, Aged 52 y'rs & 3 mo's.

With patient resignation in the confident
hope of a blessed immortality.

In memory of Anneliza Morgan, wife of David Morgan, who departed this life in the City of New York, September 28, 1839, Aged 24 years, 2 months, 7 days.

Soft was her heart and gentle was her mind
They taught each wish at virtuous voice to move
While bounteous Heaven had in her soul combined,
With duty, friendship, and with friendship love.

In memory of Charles Morgan, Sen, who departed this life Jan 1st 1836, Aged 79 years 7 months & 23 days.

Peace to the spot where his remains are laid
May purest bliss await his friendly shade
Nature endowed him with her noblest part
A peaceful mind, a kind & feeling heart.

In memory of Catherine, wife of Charles Morgan, who departed this life Dec 13, 1894, aged 84 years & 40 days.

The soul redeem'd forsakes the tomb
To the redeemer quickly flies
Cherubs guide her to her home.
And shout her welcome to the skies.

In memory of David La Forge, who deceased Nov 21st 1795, in the 72 year of his age.

In memory of Mary, wife of David La Forge, who died May 5th 1809, in the 84 year of her age.

In memory of John Morgan, son of Charles & Catherine Morgan, who departed this life August 21st 1823, aged 11 years & 23 days.

Behold all you that do pass by
As you are now so once was I,
As I am now so you will be
Prepare for death and follow me.

Sacred to the memory of Charles Morgan, Jun, son of Charles and Catherine Morgan, who departed this life on the 12th of January, 1830, aged 36 years & 8 days.

Who lived respected and died
Lamented a loss to his friends and
Society at large.

In passing by drop not a tear
Weep not for me my parent dear
Sweet is the rest found in the Grave
Sweet the repose our Saviour gave
His just decrees let us adore
In him we meet to part no more.

Benjamin son of Abraham and Mazabeth La forge. Died Sept 6th 1830, aged 6 years, 10 mo & 14 Days.

He's on the Saviour's bosom laid
And feels no sorrow there
He's by an heavenly parent fed
And needs no more your care.

Elizabeth Morgan, wife of Abraham La Forge, died Nov. 15th 1865, in the 89 year of her age.

"Blessed are the dead that die
in the Lord".

Sacred to the memory of Catherine Karr, a native of County of Antrim, Ireland, who departed this life September the 10, 1840, aged 17 years.

In memory of Margaret Hanmer, who departed this life Mch 18, 1845, aged 21 years & 6 months.

The last two stones referred to are at some distance from the others, and outside of the family circle. The one to the memory of Margaret Hanmer lies on the ground, and the other is nearly over. When I go by, I sometimes give this stone a vigorous pull, perhaps I might be able to

straighten it, but that only record to the memory of Catherine Karr must fall, unless there is a helping hand.

As in some of the old fashioned histories that took no account of the times of peace, but only recorded the wars, making one almost commence where the other ended, so a cursory glance at the sixteen tomb stones in this little plot, with many of the

dates of death following close upon one another, gives the impression that a grave was dug almost as often as the harvest was gathered in the neighboring fields. There were indeed eight deaths in twelve years, but even in this history there are several breaks, when there was sufficient time for a little child to grow to manhood.

PART THIRD.

The family burying grounds mentioned in this and the former accounts do not contain the oldest inscribed monuments on the Island. In the grounds surrounding the Dutch Reformed Church at Port Richmond, there are a few old graves, and in St. Andrew's church yard stands a row of five brown stones to the memory of Gov. Dongan's relatives. The earliest of these is to Walter Dongan's first wife Ruth, who died July 28th, 1733. The monument to Winance Johnson, on the hill side at Prince's Bay, bears the date of March 16th, 1734, as already given.

Elizabeth, daughter of Ruth and Walter Dongan died July 1st, 1749, aged 19 years, and Walter Dongan died July 25th, 1749, aged 57 years. Two of the great grand children of Walter and Ruth Dongan lay buried beside them. They are Thomas Charles Bradish, son of John and Patience Dongan, who died Nov. 21st, 1789, aged 9 months, and John Charlton Dongan, Jr., who died Oct. 23d, 1791, aged 5 years. The local history says that Thomas Charles Bradish Dongan died Nov. 25th, instead of the date given above, which, however, is correct.

These head-stones and some old houses are the most ancient human relics, excepting the Indian Kitchen-middens, on the Island, and it is to be regretted that the "church wardens and vestry of St. Andrew's Church," do not restore these old time monuments to their proper position when they have fallen down. The inscription may be preserved better when the stone lays on its face, but it is just as likely to fall the other way, and then it is not so lasting.

Nestling close to the South-west wall of the Court House in Richmond Village, and surrounded by an iron fence, are six tomb stones. The Winter sun beats down warm upon the graves, and they are strangely in contrast with the iron barred cells of the jail. The Judge and the jurors may look from the Court House window, and see the white stones looking up to them, for they are faced that way, and Death seems to sit in their midst and call, "Sentence for one year or for twain, but I will sentence ye all for ever." And

so these grave stones plead their cause

A tall marble monument in the centre of the plot, is inscribed:

Sacred to the memory of John A. Van Pelt, Esq., died March 5th, 1826, Aged 66 years, 6 months, 5 days; And of Susanna Van Pelt, his wife, born September 2d 1763, died February 27th 1863.

Her dying words were,
Oh, I am going home
To my blessed Jesus
I shall see him for myself
And not another.

The reverse side of this stone bears the inscription:

Susan Van Pelt was The gandraughter of Jacob Rezeau, Senr, And the last of five generations interred in this burying ground. They were Huguenots, who left France when persecuted for their religion; settled in this neighborhood. They selected this spot for their last resting place on earth. Sacred be their dust. Susanna Van Pelt reached the advanced age of 99 years 5 months, 25 days. This monument is erected by her only surviving relative.

Near this monument stands the one originally erected to the memory of John A. Van Pelt, and the inscription is the same as that already given.

Cavalier R. Van Pelt died, Aug 18, 1854, Aged 58 yrs, 3 mo's & 7 d's.

Sacred to the memory of Catherine Ann Wheatley, wife of Henry William Wheatley, who departed this life May 16th 1818, Aged 25 Years, 2 Weeks and 5 Days.

Jacob Rezeau and Susannah his wife

One stone bears this inscription:

Richard Johnson died July 1, 1815 in the 79, year of his age. Wintee Johnson died June 1788 in the 43 year of her age.

Near by is the little monument to Richard Johnson Jr, Aged 14 yrs.

There are a few grave stones to the Northwest of Richmond, on the hill-top, among some hickories and oaks. There is a fine view from the site, better than from the hill where the old British fort is, for this one is the last of the range and is high and commanding. There are six home-made head stones among them, which mark unnamed graves, perhaps of the first settlers. Some distance removed from the others is a white marble stone to the memory of

Cornelius Bedell, Died May 16, 1898, Aged 63 years & 10 months.

In a line are the four following:

Susan Winant, wife of Jacob Winant, Died January 31, 1832, aged 59 years & 8 months.

98 Jacob Winant, Died June 30, 1820 aged 61 years.

99 In memory of Cornelious, son of Jacob and Susan Winant, who departed this life the 6th of October, 1817, aged 19 years 6 months and 6 days.

100 In memory of Jacob Rezeau, son of Jacob and Susan Winant, who departed this life the 4th of November, 1817, aged 21 years, 8 months and 6 days.

101 Hannah Cole, wife of Abraham Cole, Died February 1, 1832 aged 87 years and 4 months.

102 In Memory of Susannah, wife of Abram Cole, who died May 7, 1841, aged 77 years.

103 In Memory of Abraham Cole, who departed this life March 11th 1848, aged 79 years, 11 months & 18 Days.

104 In Memory of Abraham Cole, who departed this life March 14th 1813, aged 77 years.

105 In Memory of Mary, wife of George Little, and daughter of Abraham and Hannah Cole, who departed this life March 15th 1815.

106 In Memory of Lot, son of John Cole, who departed this life on the 29th of October 1801, aged 10 years, 3 months and 1 day.

107 Dedicated to the Memory of Abigail, the wife of Andrew B. Decker, who departed this life in the full assurance of a Glorious Immortality, October 25th 1828, aged 31 years.

As a Wife she was affectionate and kind
As a Mother, the most tender, and as a
Christian, she manifested in her life
the fruits of Righteousness and true
Holiness.

108 In memory of Matthew Decker, who died Sept 20th 1827, in the 33d year of his age.

Therefore be ye also ready for
in such an hour as ye think not, the
Son of man cometh.

109 Dear partner of my life
And children whom I love
Remember dying strife
Which you have got to prove.

110 Sacred to the memory of Joseph Decker who departed this life June 25th 1835, aged 75 years, 5 months and 21 days.

111 Sacred to the memory of Catharine, wife of Joseph Decker, who after a long and tedious illness, which she bore with the most pious resignation, departed this life in the full assurance of a glorious Immortality, on the 4th of Feb. 1824, aged 57 years, 11 months & 20 days.

I leave the world without a tear
Save for the friends I hold so dear.
To heal their sorrow Lord descend
And to the friendless prove a friend.
E. Norris Eliz'th Town.

112 In memory of Marian, wife of Matthew Decker who Deceas'd Novr 7th 1801 in the 63d year of her age.

No more my God I boast no more,
Of all the duties I have done,
I quit the hopes I had before,
To trust the merits of thy son.

Now for the love I bear his name,
What was my gain I count my loss,
My former pride I call my shame
And nail my glory to his cross
H. O.

"H O" are the initials of H. Osborn, spoken of in connection with the Elless burying ground. 112

113 In memory of Moses Doty, who died March 7th 1785, aged 53 years and 7 months.

114 In memory of Ann, wife of Moses Doty, who died July 17, 1783, Aged 48 years & 11 months.

In memory of John Bedell Esqr who Departed this life January 7th 1781 aged 63, 3 months & 13 Days.

115 Some of these grave stoves have representations of skulls and cherubs' heads above the inscriptions, but on the one just mentioned, a cross bones is pictured.

116 In Memory of Hannah, Widow of John Bedell, Esq., who departed this life January 22d 1814, in the 92nd year of her age.

117 In Memory of Eliza, the Wife of Israel Bedell, who departed this Life on the 30th Day of October, 1803, in the 44 year of her Age.

In Memory of John Bedell, son of John, and Hannah Bedell, who departed this Life on the 5th Day of June, 1807 in the 59 Year of his Age.

118 I leave this world without a Tear
Save for the Friends I hold so dear
To heal their sorrows Lord descend
And to the friendless prove a friend.

In Memory of Catharine, Wife of John Bedell, who died Dec 15th 1833, aged 81 years.

May we like her prepare to meet our God
And seek our home in yonder bright abode,
So may we live that we may meet her there
And wake from death a higher bliss to share.

Between Richmond and New Spring ville, and a long distance from any house or road, are three graves. They stand in the woods near the borders of the cleared land, and a sad, dreamy view of field, meadow and Kill stretches uninterruptedly for a mile and one half, or more beyond. When the leaves are on the trees the gravestones are nearly hidden by the thick growth, and the dark cedars, the large grape vines and tangle of brier, make the place one where some poor, disappointed mortal might like to be laid. In Summer the spiders stretch their webs from monument to trees and bushes, and the caterpillars, with measured walk, go they know not whither over the stones. The cat birds rear their young in the tangle, the crows light on the cedar trees and all that round of nature that

no man can fully describe goes steadily on.

Standing alone and out of sight of the other two, which are over the rise, a hundred feet or so away, is a head-stone bearing this inscription:

In memory of James S. Decker, who departed This life, July 29th 1839, aged 78 years, 6 mo and 7 D's.

Here lies a man to rise
Witty, virtuous and wise
And fitted for the skies.

The graves of John Tysen and his wife are side by side; hers marked by a little brown head stone, and his by a large marble one.

In memory of Cornelia, wife of John Tysen Esq., who died February 8th 1805, aged 67 years, 6 months & 2 days.

Here Cornelia lies till Christ shall call the dead to rise.

Sacred To the memory of John Tysen Esq., who died Mch 7th 1808, Aged 76 years & 5 months.

As a tribute of filial gratitude and respect to a fond & respected father
This stone is erected by his only surviving son Jacob Tysen Esq.

Let me die the death of the righteous
And let my last end be like his.

A long lane leads from the Amboy road to a two story stone house standing on a point of land that projects into the low lying meadow, nearly opposite to the head of the Great Kill. This is the old Lake homestead, and over the door chiseled into the stone is the date, May, 1786, with the word year over the figures. This is probably the date of erection. A wooden addition has been built on the Northeast end and the trumpet vine that grows luxuriantly on the Island, when planted, has taken possession. A few Lombardy poplars stand near the house, and tall box bushes in the old garden. These latter are so large that one can sit on a chair in their shade, for they are fully seven feet high, and one branch measures a foot and eight inches in circumference. Several have been cut down and the cows have also somewhat spoiled those that remain.

A short distance from the homestead and circled about with wild cherry trees is the burying ground, where many of the stones have been broken, though the pieces lie by, and many others have fallen

down. That rollicking spirit possessed by the average youth, variously exhibited according to individual tastes, and that care for the preservation of what is his only, that is the principle of many a man, causes much that is old and much that is beautiful to be destroyed. These head-stones with their tops broken off, the hole, several feet deep, the dimensions of a coffin, by the side of the prostrate monument to William Lake, the foot stones scattered about and the mutilated box bushes in the garden, owe their present condition to one or the other of these causes.

One rainy Autumn day I visited these graves, intent upon copying the inscriptions, and in between the showers I took down the following:

In Memory of Sarah, wife of William Lake, who departed this life April 5. 1810, Aged 83 Years and 1 months.

In Memory of Mary, wife of William Lake, who departed this life November the 12th 1805, Aged 55 years 4 months and 7 days.

Here Mary lies till Christ shall call
The dead to rise.

In Memory of William Lake, who departed this life October 22, 1825, Aged 77 years.

Father Rest in Peace.

In Memory of John Lake, Son of William Lake, who departed this life January the 27th 1807, Aged 23 years and 8 Days.

My flesh must slumber in the ground
Till the last trumpets joyful sound
Then burst the chains with sweet surprise
And in my saviours image rise.

In Memory of Daniel Lake, who departed this life 16th march, 1807, aged 65 years and 8 months and 23 Days.

In Memory of Ann Lake, Wife of Daniel Lake, who died Mch. 15, 1822, aged 76 years, 7 months & 15 days.

She died in Jesus and is blest
How kind her slumbers are
From suffering and from pain released
And freed from every care.

In Memory of Susan Lake, who departed this life Jan'y 29th 1817, Aged 18 years, 4 months & 13 days.

Her mind was tranquil & serene
No terrors in her looks were seen
A Saviour's smile dispelled the gloom
And smoothed her passage to the tomb.

In Memory of Cornelious Lake, who departed this life September 3rd 1803, Aged 33 Years, 7 months & 11 Days.

O fatal stroke that rends our hearts
We little thought so soon to part

But since its thy hard fate to be
We hope in heaven to meet with thee.

While I was transcribing this inscription I heard foot steps, and raising up from behind the grave stone that completely concealed me, greatly frightened a tall, broad shouldered young man who was approaching. After the laugh, I explained my object, and if it had not been for his aid, and that of his uncle, who arrived soon after, I could not have made a complete record, for it took our united strength to move some of the stones, so as to read the inscriptions

Lewis Androvett was born Aug 26 1777 died Apr, 1841.

In Memory of William Lake, who departed this Life October 25 1799, Aged 22 Years & 9 Months.

Mourn not for me my friends
For now my race is run
It is the will of God
So let his will be done.

In Memory of Sarah, daughter of Daniel W. & Mary Lake, who died Aug 10th 1823, aged 23 days.

In Memory of Lewis Dubois, who died Sep 8th 1797, aged 55 years, 9 mos & 8 days.

Lo I obey thy summons Lord
And freely leave this house of clay
Securely resting on thy word
To rise my soul to endless day.

In memory of Capt William Lake, who died March 31st 1783, aged 33 years & 2 months.

How heavy was that mortal night
That hung upon my eyes.
Till Christ with his reviving light
My spirit bade arise.

Samuel, son of Lewis R. & Margaret P. Marsh, died Oct 10th 1811, Aged 8 mos & 10 days.

Fond parents dry those falling tears
You have no cause to mourn
Your smiling babe on angels wings
Is to his Saviour borne.

In memory of Daniel Lake, Esq. who died Aug 30, 1792, aged 73 years, 1 month & 4 days.

God my redeemer live
And often from the skies
Look down and watches all my dust
Till he shall bid it rise.

Sacred To the Memory of John Mersereau, who departed this life August the 8th 1799, aged 25 years, 5 months 6 days.

Plucked from my children in
their youthful days
When most a fathers tender
care they need,
O let a mothers love direct
your ways
In that path which
will to heaven lead.

Ranging the head-stones in rows, which is often a guide to family relationship, has not been particularly followed in this homestead burying ground. According to the local history the original Daniel Lake applied for a grant in 1679, and his grand son, Daniel, the inscription on whose stone is given above, was "born Jan. 26, 1719, died July 10, 1762, leaving a son William, born January 7, 1750, died March 21, 1783" These dates are probably not quite correct. Daniel Lake, though born in 1719, as proved by his age and date of death, did not die in 1762. Further on the history states that "Daniel Lake made his will October 13, 1789, proved Sept. 4, 1792" Of course he died between these dates, or on Aug. 30, 1792, as inscribed on the monument.

Across the field to the west is another homestead and the date, 1789, is cut in the stone over the door. But one head stone remains standing on the rising ground back of the house, though five others lay face downward against it, the upright one serving to keep these from sliding down the hill. This stone is:

In Memory of Susan, wife of Samuel Barton, who departed this life Feby 18, 1819, Aged 26 years, 3 months & 7 days.

I leave this world without a tear
Save for the friends I hold so dear
To heal their sorrows Lord descend
And to the friendless prove a friend.

Some distance back in the woods, from the Lake homestead, is a negro burying ground, but the natural head-stones are not placed in any particular order, and no inscription serves to note where old "Blacky Time" is laid. She is said to have been the last darky interred in these woods. There are several other negro burying grounds similar to this—one near the Fingerboard road and one near New Dorp Lane, but it is in "Africa," in the woods between Pleasant Plains and Rossville, and with persimmon trees growing near some of the graves, that the most pretentious negro cemetery is to be found. Of the two grave stones that it contains, one is to the memory of Capt. John Jackson, and one to Eliza Cooley.

PART FOURTH.

Walking along the narrow Todt Hill road one day, a gentleman asked me if I wouldn't help him with his horse, "he would not stand still and he could not get out of the gate." So I assisted gate, horse and man, and as we walked along together I asked what had become of the grave stones that used to stand in yonder bushes. The eyes grew questioning and the face serious, and after a time came the reply, "may I ask your name?" But it was no mere combination of letters, but rather some whispering spirit whose last resting place had been disturbed, that brought the final answer: "They were no longer wanted there, so they have been removed to a neat little plot in the cemetery."

The following are the inscriptions which they bear, copied when they stood in their original position:

Sacred to the memory of Mrs. Ann Wait, Consort of Joseph Wait, and daughter of Austin and Rebecca Barton, who departed this life October 5, 1828, aged 35 years, 4 months and 14 days.

Her life to virtue and religion given
Her death to nature, her soul to Heaven.

Sacred to the memory of Abram Burbanck, who departed this life May the 12, 1822, aged 77 years, 5 months and 22 days.

You living men as you pass by
As you are now so once was I
As I am now so you must be
May grace prepare to follow me.

P. D. Braisted, N. York.

In memory of Ann, wife of Jacob Burbanck who departed this life October 1st 1828, aged 56 years, 2 months and 23 days.

My flesh shall slumber in the ground
Till the last trumpets joyful sound
Then burst the chains with sweet surprise
And in my Saviour's image rise.

Sacred to the memory of Jacob Burbanck, who died Sept. 14, 1854, Æ 83 y'rs, 5 mo's & 5 d's.

No terror has death or the grave
To those who believe in the Lord,
Who know the Redeemer can save;
And lean on the faith of his word.
While ashes to ashes—and dust
We give unto dust, in our gloom
The light of salvation we trust.
Which hangs like a lamp in tomb.

Blessed are the dead which die in the Lord
Rev. 14, 13.

In memory of Lucy W., relict of the late Jacob Burbanck, who died Nov. 16, 1865, in her 87th year.

"Blessed are the dead which die in the Lord".

In memory of George E., son of Jacob & Martha Burbanck, who died 30th Dec. 1834, aged 1 year, 6 mos. & 8 days.

My loss my babe is gain to thee
My bosom bleads, but thou art free,
From sickness, care, and racking pain,
We're parted, but we'll meet again.

In memory of Mary, wife of John Sharrot, who died April 19, 1841, Æ 71 years, 8 mo's & 23 d's.

1
Here rest my oft divided heart
Fixed on thy God, thy Saviour, rest
Where with the world would grieve to part
When called on angels food to feast.

2
High heaven that heard the solemn vow
That now renewed shall daily hear
Till in life latest hour I bow
And bless in death a bond so dear.

3
Then why lament departed friends
Or shake at deaths alarms
Death's but the servant Jesus sends
To call us to his arms.

The marble head-stone of Cornelius Fountain, who is credited as being the first to use the centre board in yachts, lays among some bushes and young trees near Garretsons station.

In memory of Cornelius Fountain, who departed this life January 27, 1813, aged 54 Years.

A few feet from this and leaning against an apple tree is one:

In memory of Elizabeth, wife of Cornelius Fountain, who departed this life January 31, 1815, aged 52 Years.

The longest straight wood-road on Staten Island runs from Watchogue to Bull's Head, it is the "long long lane that has no turning," and near the corner formed by its junction with the Morning Star road, there are a few grave stones. The inscriptions on all but three—two recently erected, and one to the memory of Jacob Braisted, who died in 1833, aged 3 years, are given below.

In memory of John Merrell, who died Decr 19th 1826, in the 84 year of his age.

Tis but a few whose days amount
To three score years and ten,
And all beyond that short account
Is sorrow toil and pain.

Next to that of John Merrell's is a little brown stone, the letters on which are small, seeming to have been cut with a knife; perhaps it is home made. It is to the memory of

Gertui Merrell, Aged 47 years & 10 months, de-

parted this Life December 31, 1794 & was interred January 2d 1795.

In a line stand the following five head stones :

In memory of Col. Richard Decker, who died May 26th 1817, Aged 70 years and 11 days.

In memory of Wincha Merrell, who died, December 23rd 1830, aged 76 years 6 months and 28 days. Widow of Col. Richard Decker, deceas'd.

Sacred To the Memory of Mary Harriet, wife of Israel Decker, who died July 19, 1818, Aged 36 years 1 Mo & 14 Days.

Affliction sore long time I bore
In pain I wandered on,
Till God my Saviour arm'd with love
In mercy called me home.

In Memory of Ann Maria, daughter of John & Mary Decker, who died Oct 10, 1825 in the 19 year of her age.

And must this body die
This mortal frame decay;
And must these active limbs of mine
Lie mouldering in the clay.

In Memory of Reuben Decker, who died Aug. 5, 1832, aged 39 years, 5 Months & 28 days.

Side by side and a little way removed from the others, are the two following:

In memory of Isaac Merrell, who died Feby 9, 1833, Æ 46 y'rs, 6 mo's & 3 d's.

Happy soul thy days are ended
And thy mourning days below
Go by Angel guards attended
To the right of Jesus go.

In memory of Mary, wife of Isaac Merrell who died Dec 9, 1832, Æ 45 y'rs

O what hath Jesus bought for me
Before my ravished eyes
Rivers of life divine I see
And trees of Paradise

A large white marble stone is erected to the memory of seven children, sons and daughters of Daniel A and Rebecca Merrell. Three were buried in one year, and Phebe, who lived the longest of them all, was but 7 years and 10 months old when she died

Sacred to the memory of Daniel C. Merrell, who departed this life June 21st 1838, aged 34 years, 1 month and 16 days.

The rising morn we can't assure
That we shall end the day
For death stands ready at the door
To call our lives away.

John Y. Merrill Died June 6, 1858, Æ 87 y'rs, 7 mo's, 89 D's.

In memory of Abraham W., son of John D. & Ann E. Martin, who died April 15, 1845, aged 2 Y's, 5 Mo & 27 D's.

Lie here sweet babe and take thy rest
Until the judgement day;

It was the watery element
That took thy life away.

In memory of William Owen, who died Oct 1, 1852 Æ 64 years, 1 mo & 19 d's.

Farewell my loving friends farewell
No longer with you I can dwell
My Lord has called and I must go
And leave you in this world below.

One of the most noted stone houses on the Island, dating from Colonial time, is the Ridgway mansion on Long Neck. It stands on the rising ground overlooking the salt meadow and that arm of Fresh Kill known as Main Branch. There are holes for pigeons over the old time porch door, some black walnut trees and a large white willow grow on the sloping ground between the house and the meadow land, and withal, the view is wide and pleasing. "But," said my chance acquaintance, "it is the mosquitoes, they spoil a beautiful country, though up yonder, on the hill by the tavern, they are not so thick as they are here." And truly this *Culex* of the salt meadows, whose legs are annulated with white, is no inconsiderable a nuisance, and does indeed "spoil a beautiful country."

Across the Turnpike road from the mansion, where the ground on the narrow neck commences to slope the other way, is the family burying ground, now much overgrown with ailanthus trees and all those weeds that find a neglected corner. The wild and cultivated cherry trees, by the surrounding fence, have now grown large, and with the ailanthus and a few lilac bushes, make the spot quite secluded, though so near a barn that the cows may be heard munching their fodder.

Here lies ye Body of Joseph Ridgway, who departed this Life Jany ye 28th, Ano Domini, 1771, In the 49 Year of his Age.

Here lies ye Body of Mary, widow of Joseph Ridgway, who died Feby ye 22d, Ano Domini, 1771, In the 53 Year of her Age.

Above each of these inscriptions is a cherubim, and below is a rather poor representation of a crossbones

In memory of Elizabeth, widow of Thomas Ridgway, who died 3rd Mo. 8th, 1830, aged 79 years, 8 months and 24 days.

Sleep dear Mother and take thy rest

For Christ thy Lord has called thee home.

Sacred to the memory of James Ridgway, who departed this life Nov. 20, A. D., 1847, Æ 63 y'rs, 3 mo's & 13 d's.

Weep not my wife and children dear
To grieve it is in vain
Christ is our hope you need not fear
Believe in him and we shall meet again.
This languishing head is at rest
Its throbbing and aching are o'er
This quiet immovable breast
Is heaved by affliction no more.
This breast is no longer the seat
Of trouble and torturing pain
It ceases to flutter and beat
It never shall flutter again.

In memory of Abram Egbert, who died Feb. 12, 1822, aged 74 years & 2 months.

My flesh shall slumber in the ground
Till the last trumpets joyful sound
Then burst the chains with sweet surprise
And in my Saviour's image rise.

Sacred to the memory of Ann Egbert, who died Dec 17, 1948, AE 90 y'rs, 8 mos.

Farewell dear friends and children to
I bid this world along adieu
I hope in heaven we'll meet again
There free from sorrow grief and pain.

In memory of Mary Wood, Daughter of John and Keturah Wood, who died Sept 30th 1829, aged 40 years, 8 months and 7 days.

To the memory of Keturah Ridgway, relict of John Wood, who died July 18, 1849 AE 88 y'rs, 8 mo's & 19 d's.

Farewell my dear friends my Lord bids me come
Farewell my dear children I'm now going home
Bright angels are whispering so sweet in my ear
Away to my Saviour my spirit will bear.

Warren Alston died May 10, 1851, AE 79 y'rs, 4 mo's & 18 d's.

Agnes E. Travis, Born Oct. 8, 1833, died Sept 21, 1853.

Friends and Physicians could not save
Our dear young Sister from the grave
Nor can the grave confine her here,
When Jesus calls she must appear.

The verse starting "Affliction sore long time I bore" seems to have been the favourite, and it occurs on some head-stones of recent erection. It is changed and altered in various ways with a view to give some account of the last illness of the deceased, the first line generally telling the length of the illness, as "Affliction sore some months I bore" "Affliction sore 1 year, 9 mo. I bore" &c. The second line usually reads, "Physicians were in vain," but sometimes it is "tried in vain." The third line is subject to great variations; "Till God alone did call her home," "Till God above did send his love," "Till God did please to give me ease," "Till God were pleased death should him seize." "And free me from my pain," is

generally the last line, though "ease" is frequently used instead of free.

The verses commencing, "My flesh shall slumber in the ground," "Behold all you that do pass by" and "I leave the world without a tear," are also quite frequently met with on the head-stones erected in the early part of this century.

Either through the fault of the composer or the cutter, errors are not infrequent on head stones, but perhaps there is nowhere on the Island, so many of them confined to so few stones as in the case of those that mark the graves of sailors and passengers that died of yellow fever at Quarantine, where they were buried, but from which situation they were removed long ago to a site in the Clove Valley, near the Turnpike road. Mary Bather is said to have died at "Staten," the word Island having been left out. The "a" was omitted in the word coast on Capt. Tielder's head-stone and was afterward cut over the "o," and no one will ever know whether it was Edward F, or Edward T. Millspaugh, who died on the last day of the year in 1850, for either the T. was made first and cut into an F or the reverse was the case, for the correction can never explain. A stone laying on the ground bears the simple inscription, "Mary the faithful," and a white marble slab a few yards away is in memory of a very young captain and a very young husband, even a more precocious individual than the first of the Plantagenets, that is if the monument tells the truth. It reads:

In memory of Capt. Anthony Rodericks, a native of Portugal and Island of St. Michael, who departed this life September 21, 1311, aged 16 years.

Weep not for me my wife and children dear
My spirit rests above all care.

Of the one hundred and sixty inscriptions given from these homestead grave-stones, Susannah Van Pelt, who lived to be nearly one hundred years old, and Hannah Bedell, who died in her 92nd year, are the oldest persons mentioned. Ann Egbert and Albert Journeay, each of whom lived to be 90, come next in point of years. In addition fourteen women and only five men were octogenarians. The average age of the entire number is about 49 years.

It is also interesting to know that 32 died in Summer, 39 in Winter. 39 in Spring and 50 in Autumn; or giving them by months, they range themselves as follows:

Jan.....16 deaths	July.....11 deaths
Feb 8 "	Aug.....11 "
March ...20 "	Sep..... 17 "
April..... 6 "	Oct.....21 "
May.....13 "	Nov.....12 "
June.....10 "	Dec.....15 "

Of all the year it was Autumn, and of all the Autumn it was October, when death came round most frequently. and when Eliza Winant died in October, 1853, a verse was cut on the marble head-stone, the third line of which seems to find a voice in nature.

O wake thee sister, winds are sighing
O'er the grave where thou art lying,
How sad and mournful is the time,
Sister wake ! I'm all alone.

[Issued October, 1890. To succeed Part Fourth, issued December, 1889.]

PART FIFTH.

It was once considered a special privilege to be interred as close to the church as possible, and occasionally plots were sought by the most influential families, where the backs of the headstones might rest against the foundation walls. A sense of nearness to the living, and to those warm and companionable interests centered in the church, was thus conveyed, and then too, be it mentioned, there was a degree of distinction, for only a few could be buried in so limited a space. The older burying grounds and particularly that of the Woodrow church, illustrate this matter, and many stones bearing the names of early residents of the Island, will be found in the position described.

A particular spot in the Moravian cemetery was chosen for a grave, some years ago, because it commanded a fine view of the race course, situated on the opposite side of the Richmond road. The owner of the plot was unwilling, even in death, to be far away from the place where he had spent so many happy hours. Thus, also in the homestead graves, it was evidently often an attachment for a certain location on the farm, and for the farm itself, that prompted the selection of a particular situation as a burial site. Quite frequently there is an extensive view, as if, perhaps, the dead might enjoy the pleasant outlook.

A location of this kind was chosen on the crest of a low but suddenly rising hill, that overlooks a wide expanse of salt meadow and the Great Kill, to the ocean beyond. It has once been mentioned in this article, and the inscription to the memory of Mrs Barton, on the only standing monument, has been given. Piled against this brown sandstone were five others, which could not be overturned without assistance, but friendly aid came in the hands of Charles W. Leng, and with the laconic consent of the farmer, to "go head," the monuments were moved, the inscriptions copied, and the pile neatly adjusted again. The following are the epitaphs:

Sacred to the Memory of Sarah Ann, Daughter of Henry & Mary Perine, who died the 3d Day of June, 1799 in the 2nd Year of her age.

Sleep on sweet Babe & take your peaceful rest,
God calls you home because he thought it best.

Sacred to the Memory of Mr. Edward Perine, who died the 21st Day of April 1777, in the 45th Year of his Age.

Plucked from my Children in their youthful Days,
When most a Father's tender Care they need,
Oh let a Mother's Love direct your Ways,
In that bright Path which will to Heaven lead,
Should she Assistance want lend you an Ear,
And God will love you for his tender care.

Sacred to the Memory of Mrs. Anne Perine, who died the 5th Day of April 1806, in the 67th Year of her Age.

Children farewell and strive to know the Lord.
Obey his Precepts and receive his Word;
Take up the Cross of Christ, and follow him,
Who died to cleanse your precious souls from sin.

Sacred to the memory of Joseph B Holmes, who departed this life March 28th 1823, Aged 23 years, and 12 days.

Farewell dear wife my life is past,
My love to you till death did last;
Then after me no sorrow take,
But love my child for my sake.

In Memory of Elizabeth wife of John Wood, who departed this life August 25th 1822, Aged 32 years & 2 months.

My flesh shall s'umber in the ground,
Till the last trumpets joyful sound
Then burst the chains, with sweet surprise,
And in my Saviours image rise.

The last mentioned monument stood near to that of Mrs. Barton's and was broken off close to the ground by a falling tree. The inscription was probably damaged at the same time, for now several large flakes are missing from the face of the stone, but the correct letters, have, no doubt, been restored in the italics given above.

At the head of Great Kill, on the Carter place, and standing on the lawn, under an European pine, is a square block inscribed:

Alex. Anderson, Dec 5, 1836; Aug 22, 1871.

This block has a curious history. It was denominated a "pedestal" at a rail road auction sale in New York, where it was purchased, but upon its delivery it was discovered to be a gravestone. Though probably now far away from Alexander's remains, it still serves to perpetuate his memory.

Quite close to the scenes of domestic life, is the grave situated back of the little cottage on the Rossville road. The garden is small, and a variety of appurtenances to household economy are ranged about, and in their midst stands the marble monument, with its back close to the fence. It is

In Memory of Celia Harris, who departed this life February 23rd, 1850, aged 51 years, 6 months and 20 days.

Behold and see as you pass by
As you are now so once was I;
As I am now so must you be
Prepare for death and follow me.

Beyond New Springville, on Garretsons road, and some distance back near a lane, are a few unmarked graves, that are now rapidly passing from memory. A farmer, whom we met, put his hand to his forehead in an effort to recall the past; he knew of the graves, he said, but had forgotten the circumstances connected with them. His father, who died in the Spring, might have told us, for he assisted at one of the burials years ago. Thus do the dead only know of the dead after a little while, and perhaps it is fortunate that their knowledge is unutterable, for what would we do without death and forgetfulness?

I once read to a farmer, the inscriptions from some of the grave stones in his

vicinity. He remembered the names, said "yes" to signify his acquaintance with the deceased, and listened intently to each epitaph. But a potency lingered in one of these meagre tongued inscriptions that I wot not of, for after its reading, he asked quickly: "Is he buried there?" and being assured that he was, he refused to accept a copy of the epitaph. Probably he wished to forget that man, but he was bound inseparably to his memory, and even the avowal that the deceased had suffered "affliction sore," was not considered sufficient punishment for those unkindly deeds which he had no doubt committed.

On the Simonson farm, in New Springville, and a long way back from that cosy little stone house in front of which stands the giant elm, is a tomb covered by a marble slab. It is by the side of a lane, and so embowered by sumachs, that you may pass it by without notice; but the pleasant effect of this wild growth could not be surpassed by carefully attended vegetation. Some years ago there stood several head-stones on the spot, but the inscription on the marble slab of the tomb, now reads:

In memory of Barnet and Abigail Simonson; who died 1867, and of their daughter Johannah. H. S. 1874.

Between New Springville and Elm Park, on the Morning Star road, there is a small piece of ground with a wooden fence on three sides and a neat stone wall in front. Large willows cast a shadow in Summer over the private vault that is placed in the centre of the plot, and which is the most prominent object from the windows of the house directly across the way. There is no inscription, only a wooden door and pad-lock on the side farthest from the road, but it is said that a Mr. Mersereau lays buried there, who for private reasons chose this particular site, overlooked by the windows, as his final resting place.

There are a few graves in a field opposite the dye works on Cherry Lane. A painted board and a broken head stone, are the only monuments, the majority of the graves being marked by stakes, or the ordinary mounds. It is stated that some years ago a congregation of colored people erected a small church near by, and maintained it for a time. But interest lagged; there came no revival, nor paint, nor putty, and bad boys threw stones at the windows. By and-by, the triumphant party on the evening of election day, fastened a rope about the roof tree, and mid the cheers for an unregenerated soul the little church fell down. That portion of it that did not mysteriously disappear was piled on a cart in broad daylight, and being enured to anathematical showers, and otherwise well seasoned, is said to have made most excellent material for fences.

The field was still used for a burying ground after the church was gone, and lately a white board, bearing the following in neat black letters, was placed near the road:

In Memory, Aaron Bush, Born, Apr. 5th 1842, King & Queen Co. Va. Died Aug. 2nd, 1889, aged, 46 years, 4 months and 2 days.

The marble head-stone is broken in two, and half of it lays near one grave and the remainder by the side of another, thus making it uncertain to which it belongs. The inscription reads:

Augustin Jones, died Feby 18, 1873, aged 33 years.

The existence of these graves will probably soon be forgotten. The painted board cannot last long; the plot is unprotected by a fence, and only a clump of particularly high weeds and tangle, mark its site in the rest of the field.

The older residents remember the grave-stones that once stood near the corner of the Fresh Kill and the Eldingville roads, close to the present large barn; but the monuments that are most often recalled, are those that stood on what is now the Athletic Club ground, at the "Bend" of the Shore road. All of the land thereabouts belonged to the Crusers in old days; the "Cruser Springs" thus gained their name; what is now the Pelton residence was their family mansion, and the grave-stones were erected in memory of its members. It is said that these stones stood in two groups, three close together, and two at a little distance, and that there were many other graves unmarked by inscribed monuments. When the Crusers sold the estate they retained the family burying ground, but as years went on and money was needed, they parted with that also for five hundred dollars, and thus it came about that the head stones were removed and two of them laid down as flagging. It is also stated that an elderly gentleman came to the Island some years ago, before all of the above mentioned incidences had transpired, and enquired along the shore for the Cruser burying ground, and was finally directed to this one. The monuments had at that time been laid down by the graves and covered with sod, but he received permission to examine them, and thrusting his cane into the earth, he discovered where they lay and directed the operations of the workmen. Thus was he enabled to read the inscriptions and tell those who stood by, his degree of relationship to the deceased.

There is at present, an old vault on the Athletic Club ground near to the Eastern line fence, and close to where the grave-stones stood. The door has had several slabs placed in front of it; the earth has been filled in to the natural slope of the hill, and everything so arranged that for some time the presence of the vault was totally concealed. But there is now a hole

in the ground caused by a few bricks in the top of the vault having fallen in, and thrusting my head through this aperture one day, I was pleased to discover two of the Cruser grave-stones. They read :

In Memory of Cornelius Cruser, who departed this life, December 25th 1807, Aged 71 Years, 5 months and 17 days.

In Memory of Beliche Cruser wife of Cornelius Cruser, who departed this life February 14th 1815, Aged 75 Years and 8 months.

Perhaps if all of the rubbish, the bed-springs, pieces of stove pipe, tin cans and broken glass, that have been thrown in this old vault, were removed, another head stone might be found

Two of the members of this once prosperous family are interred in that dilapidated little burying ground that stands on the steep hillside where the Clove and the Richmond roads meet. In 1809, what was afterward known as the "Old Clove Church" was built there. It was a small structure, for a large building could not conveniently have been erected on the suddenly sloping hillside. This was the first Baptist church on the Island, and in the annals of the county there is an interesting account of its rise, its misfortunes, and of its final abandonment. Though the monuments are in no sense those of homestead graves, yet it will do no harm to preserve a record of what this ruinous little burying ground contains, especially as so many of the surnames are those of the early settlers of the Island.

The church stood on a level place a few feet square (about 20 by 30 ft.) and all but three of the grave stones were on its Northerly side, and were set in quite regular rows, up and down the hill, with their faces toward the South. Commencing at the most Northerly row and giving them in regular order from the top down, they are as follows :

In memory of Mary A. Edmonds, wife of William Eldredge, who died, March 3, 1848, \AA 22 years, 1 mo & 2 d's.

Softly now the break of day
Fades upon my sight away
Free from care from sorrow free
Lord I would commune with thee.

Her Father lies buried on the left; died 1833, and her Step Father on the right; died 1844.

Erected by her Husband.

In memory of David R. son of James B. and Esther B. Peffers, who died Sept. 10th, 1834, aged 6 years and 4 days.

Sacred to the memory of Hannah Peffers, who departed this life Sept 23rd, 1832, aged 29 years.

O sister dear I dry up your tear !
I am not dead but sleeping here,
As I am now soon you must be
Prepare for death and follow me

Erected by her sister, Anna Peffers

H. C. Page.

Augustus Nye, Died Apr. 29, 1846, Aged 33 y rs, 8 mo & 13 days.

Farewell dear wife, my life is past
My love to you, while life did last,
Then after me no sorrow take
But love my child, for my sake.

Mary Augusta, daughter of Augustus and Mary Nye, died Feby 10, 1845, aged 2 y rs, 7 mo & 20 days.

James Webb died June 14, 1839, aged 3 mo & 23 d's. Amelia, died Aug. 9, 1841 \AA 1 y r 9 mo., & 10 d's

Children of Augustus & Mary Nye.

Sleep lovely babes
And take thy rest,
God call'd you home
He thought it best.

In Memory of John Lockman, son of Charles and Susan Vanpelt, who died September 10th 1821, aged 1 year, 2 months and 10 days.

So fades the lovely blooming flower,
Sweet smiling solace of an hour.
So soon our transient comforts fly,
And pleasures only bloom to die.

(2nd row)

Abraham Cole departed this life June 12th, 1815, aged 59 years.

Weep not for me surviving friends,
I've paid the debt was due;
Prepare yourselves, you know not when
Jesus will call you too.

To my Mother, Ann Stevenson Died 1st of May 1843, in the 65th year of her age.

(3rd row)

In memory of Garret Fountain, who died May 22nd 1858, \AA ed 92 years, 5 months and 17 days

"Precious in the sight of the Lord,
is the death of his saints"

Psalms cxvi, 15

In Memory of Ann, wife of Garret Fountain, who died October 8th, 1826, aged 57 years, 6 months, and 19 days

O ! death thou destroyer can naught restrain thee
Can neither usefulness piety or worth;
The humble Christian and the unshaken friend
The affectionate wife the tender parent,
The useful Citizen lies here a prey to thee,
But short thy reign, the resurrection morn,
Shall set thy prisoner free in an eternal day.

In Memory of Margaret, wife of Henry Kruser, who departed this life April 16th, 1829, Aged 73 Years and 2 Months.

The righteous shall be in everlasting remembrance.

In Memory of Henry Kruser, who departed this life, Nov. 2nd 1851, Aged 79 y's, 10 mos & 12 days.

Surely he shall not be moved forever,

Ps; 112. 6.

Gather my Saints together unto me those that have made Covenant with me by sacrifice

Ps; 50. 5.

Sacred to the memory of Capt. Garret W. Fountain who departed this life Nov 13, 1847, \AA 48 y's, 3 mo's & 7 d's.

He was a dutiful son a kind Brother-
er an affectionate Husband, he died
in full hope of a blissful immortality,
may our last days be like his.

(4th row)

In memory of Ann Decker, wife of Charles Decker who died May 21st 1844, aged 56 years, 6 months & 24 days.

Her children arise up and call her
blessed, her husband also and he
praiseth her
The Lord he called and bid her come
Jesus smil'd and took her home.

In memory of Mary Vroome who died, Oct 13, 1851, \AA 74 y rs, & 1 mo.

She rests in hope

In memory of Maria, wife of Israel Vreeland, who died Sept 1, 1849, \AA 41 y rs, 8 mo's & 26 d's.

Here lies a tender Mother.

In memory of Charles E., son of Israel & Maria Vreeland, who died May 22, 1846, \AA 16 y rs, 9, mos & 22 d's.

In memory of Mary Eliza, wife of Joseph P. Burgher who died Oct 7th 1838, aged 22 years

As fades the rose so youthful bloom
Withers and drops into the tomb

204
On lofty wings our prospects soar
But death may blast them in an hour
In Memory of Mary E. wife of Samuel Barton,
who departed this life August 10th 1833, aged 36
years, 6 months and 1 day.

She was an agreeable companion
an affectionate wife
a tender mother and true friend

206
In Memory of Catherine Maria, Daughter of
David and Anna Van Name, who died November
24th 1826, aged 2 years, 5 months and 4 days

Alas twas brittle clay
That built this body first
And every month and every day
Tis mouldering back to dust.

207
In memory of James McClees. Died April 29th
1835, Aged 33 years, 2 months & 11 days.
(5th row)

Erected in memory of Ann Taylor, wife of Abner
Taylor, who departed this life April 26th 1833 aged
24 years, 9 months and 15 days.

Beneath this clod lies buried here
A friend, a wife, a mother dear
The Lord saw best in life's fair bloom
To call her to an early tomb.
Sweet babes and husband all adieu
Till in the skies I shall meet you.

208
John H. Fountain, died August 30, 1840 aged 26
years, 2 months and 20 days.

Hes sleeping where the storms of Heaven
Oft beat upon his breast
But they cannot now rouse him from the grave
Or break his tranquil rest.

209
(Top broken off). daughter of James and Lucinda
Fountain, Born in Montgomery, Ala. & Died on
Staten Island, aged 1 year and 2 days.

210
John A. Fountain, died July 27, 1865 aged 79
years, 11 months and 2 days.

We saw him pass from earth away
As sets the Summer sun
The smile that lingered on his lips
Proclaimed a victory won;
Now moored beyond the storms of life
On the eternal shore
He triumphs over the tyrant Death
And lives forever more.

211
Margaret, wife of John A. Fountain Died Feb
6, 1868, Aged 75 years, 5 months and 16 days.

We saw her pass from earth away
As Father did before;
She went to join in singing,
Praise forever more.

We saw her linger here on earth,
Waiting her summons home
Patiently, she joined in prayer,
Not mine, thy will be done.

212
In memory of Maria, wife of Isaac Haughwout,
who departed this life July 31st 1840, Aged 27 years
& 3 months, also an infant, aged 15 days.

Behold He taketh away who can
hinder Him, who will say unto Him what
doeth Thou. Job 9th Chap 12 Verse.
This life's a dream a fading flower
That thrived and vanished in an hour;
But death! false friend to you and me
Will shortly come and summon thee.

The above mentioned stone stands alone,
forming the commencement of what
would have been the sixth row. The fol-
lowing stones are on the opposite side of
the church foundation, that is, to the
South : 213

Sacred to the memory of Robert Ibertson, son of
James & Isabella Kennedy, who departed this life,
April 3rd 1830 aged 18 years 11 months & 11 days.

He grew up like a well watered plant;
shot deep, rose high, and bid fair for
manhood. But just as the cedar began
to tower, and promised ere long to be the
pride of the wood, and prince among the
neighboring trees, behold the axe is laid
to the roots the fatal blow is struck and all his
branching honours tumble to the ground 214

His life was sacrificed.

Charles Ford, son of Aruna & Jane Martin Died
April 21st 1835, aged 4 years & 4 months.

Here lies the grief of a fond
mother and the blasted expecta-
tion of an indulgent father. 215

Sacred, To the memory of, Rev Arauna R. Mar-
tin, who departed this life October 26th AD. 1835,
Aged 50 years 1 month & 1 day.

He was one of the best of sons
the kindest of brothers
an affectionate husband
and an indulgent father

He faithfully discharged all the duties
of a citizen and a Gospel minister.
He thundered in his preaching; he
lightened in his life, he has gone home
to hear the welcome sound "well
done good and faithful servant."

Erected by his wife to prove her love to the end.

The Rev. Mr. Martin was pastor of the
"Old Clove Church" for twelve years,
during what appears to have been its most
prosperous period, but his monument now
lays broken and half buried in the sod,
and a part of it was only discovered by
chance. Indeed many of the monuments
have fallen down, and if it had not been
for that same friendly assistance that
aided in moving the head-stones at Great
Kill, several of them could not have been
overturned. Only a few years ago the
graves were shaded by a thick growth of
cedars, and a mat of moneywort and
periwinkle overspread the ground. The
cedars have been cut down, but the brush
lays among the graves, and a tangle of
growthy vines and luxuriant weeds have
taken possession. It is not uncommon to
hear the passers by, comment upon this
dilapidated burying ground, whose gate
has been masoned up, as if it were now to
be left forever to care for itself.

October, 1890.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION OF STATEN ISLAND.

January 9, 1890

Meeting called to order at 8.40 p. m.

Mr. George J. Hicks was elected secretary *pro tem*.

The building fund committee reported that the public appeal, heretofore adopted, had been printed and distributed to all members, to the press of the county and to about 200 prominent citizens in all parts of the Island.

Mr. Thos. Craig showed specimens of Staten Island pond life under the microscope. Amongst the objects shown were *Amœba proteus* and *Protococcus viridis*. The latter organism is the cause of the green coating on the trees, stones and fences, which has attracted so much attention lately, especially in New York, where some persons have tried to connect it with the prevailing epidemic of influenza or "grip." Dr. N. L. Britton gave an amusing account of his interview on the

subject by a *Mail and Express* reporter.

Dr. Britton showed seeds of native orchids (*Corallorhiza odontorhiza* and *C multiflora*), under the microscope, and explained their differences of appearance and structure.

Mr. Arthur Hollick presented specimens of *Draba verna* in full bloom, collected at Tottenville December 30th, at which date the fields in places were white with it. Skunk cabbages were in full bloom in abundance in many of the swamps at the same place.

Mr. Hollick also showed fossil leaves in clay ironstone from the shore at Tottenville. The specimens were part of a recent rich find, resulting in adding many new species to the local fossil flora, which will be studied and reported upon at some time in the future.

Adjournment at 10 o'clock.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

February 13, 1890.

Informal meeting—a quorum for the transaction of business not being present.

The secretary of the building fund committee made an informal report of progress, showing the following status of the building fund:

Acknowledged at date of last meeting.....	\$1,050 00
Since pledged :	
Capt. A. L. King (additional).	150 00
A. G. Methfessel	100 00
Hon. Geo. Wm. Curtis.....	100 00
C. W. Hunt.....	100 00
J. Kadletz.....	10 00

Total amount pledged at date...\$1,510 00

Amongst the various communications read was one from a prominent resident of the Island, offering to donate half an acre of land for the building. The secretary was not, however, authorized to make public the donor's name. Attention was also called to the many favorable notices of the enterprise in the local papers and elsewhere.

The old milestone, formerly standing at the junction of Signs Road and Richmond Turnpike was on exhibition, having been secured by the association since the last meeting. This was supposed to be the last one remaining on the old post route between New York and Philadelphia, or at least upon that portion of it which crossed Staten Island. The stone is considerably the worse for wear, the upper part having been chipped off, possibly for mementos, thus destroying part of the inscription, which now reads :

Miles
to
N. YorkE

The figures denoting the distance were doubtless upon the part which was chipped away. This old and interesting relic of bygone times has been secured none too soon, and the association is to be congratulated upon having secured and placed it where it will be safe from further danger. In this connection Mr. Arthur Hollick stated that at some future meeting it was expected that a paper upon the subject would be presented, and then read the following brief abstract from Clute's History of Staten Island :

"After Governor Tompkins had laid out and opened the Richmond Turnpike stages ran regularly over the whole length of the new road, in connection with steamboats from New York, and constituted part of the route of travel between New York and Philadelphia. At the western terminus of the Turnpike stages were carried over the Sound by means of large scows, and this ferry received the name of the 'New Blazing Star.'"

A mummified rat was shown, presented by Mr. Daniel Campbell. The animal had contrived to force its way into an angle between a beam and the cellar wall of a dwelling in New Brighton, and for some reason had been unable to extricate itself. The remains were thoroughly dessicated and excellently preserved.

Mr. E. M. Eadie presented a large piece of drift rock from Old Place, probably Oriskany sandstone, containing *Spirifer arrectus*.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

March 13, 1890.

Informal meeting.—Mr L. P. Gratacap exhibited specimens of quartz geodes and limonite concretions, from the iron mines near Four Corners, loaned for the occasion by the superintendent of the mines, Mr. Amos Smith.—Following is an abstract of Mr. Gratacap's remarks:

The specimens form but a small proportion of those which Mr. Smith has collected, and although they embrace but two, or at most three, mineralogical species, they are interesting from their real beauty, and for the speculations they suggest as to their origin. The species are quartz, limonite and Göthite. The latter occurs as a delicate closely appressed velvety surface, bronzed yellow in color, and consisting of a film of minute needles. It may be referred to the variety of Göthite known as "sammet blende," and is strikingly beautiful when its color and texture appears in a direct light. The limonite is shown in siliceous concretions, sometimes in concentric shells, and in other instances enclosing ferruginous pebbles, between which an infiltrating seam of iron cement has thrown interior partitions. The quartz groups are large and handsome, and occur as geodes or small rounded mounds of slightly divergent, faintly amethystine crystals. They are characteristically alike in having the individuals composed of groups of interfering pyramids, amidst which the central crystal, most fully developed, rises, and at a distance seems to blend the jutting faces of the subordinate rhombohedrons with its own, and form a single stout termination. This peculiarity gives a slightly drusy appearance to the entire surface. The elements of as many as twenty-four pyramids are seen in some of the groups. These quartz groups have

all doubtless formed the central crystallizations of geode-like siliceous balls or conduits. They have been found by Mr. Smith at the lower levels of the surface diggings, near the underlying serpentine ledges. The ores in which they occur are highly siliceous limonites, which were deposited, in all probability, by the oxidation of iron salts carried upward by thermal waters flowing through the crevices of the serpentine mass, and fed to some extent by surface waters carrying dissolved iron oxides, a process made familiar by the papers of Drs. Hunt and Julien. This view is supported also by Dr. Britton (Geol. Richmond Co. Ann. N. Y. Acad. Sci., Vol. II, p. 177.)

Now the experiments of Schaffhäutl, Sevarmont and Daubrée, in making artificial quartz, have shown that gelatinous silica and glassy silicates are attacked and dissolved by highly heated waters, either alone or assisted by hydrochloric or carbonic acid, and that such solutions deposit hexagonal pyramids of quartz. These interesting quartz groups in the iron beds point conclusively to the exudation, from the serpentine rocks below, of warm springs, at whose mouths, upon cooling and removal of pressure, the quartz pyramids have been formed. Their amethystine hue is attributable to manganese, which is a prevailing ingredient of the iron ore of this region.

As to the source of the silica it is a possible hypothesis that it has been supplied in a soluble form from the slow change involved in the decomposition of hornblende masses, and the formation of serpentine. In such a change there would certainly be a discharge of silica or silicates, and they would naturally enter into solution in subterranean waters, which

were themselves active agents in bringing about the very decomposition from which these products result.

Finally, the interrupted crystallization to which we have especially alluded, suggests that there has been rapid cooling and *motion*, such as would occur at the orifice, and along or around the mouths of springs; unlike those magnificent results in Arkansas, where brilliant, sharply cut, and long crystals, would seem to indicate a slow growth of the quartz prisms in a dense solution.

Mr. Arthur Hollick showed specimens of *Anemone Hepatica, L.*, the common Liverwort, collected in full bloom at Prince's Bay on February 16th. This is the earliest recorded date at which it has been found in blossom on Staten Island, and is another evidence of the phenomenally mild winter. Following are the earliest recorded dates at which this flower was found in blossom in previous years:

1871....March 25th	1880....not recorded
1872....April 11th	1881....April 10th
1873....April 10th	1882....April 1st
1874....March 21st	1883....April 8th
1875....April 10th	1884....April 20th
1876....April 1st	1885....April 25th
1877....March 24th	1886....April 11th

1878 ...March 10th	1887....April 17th
1879....March 29th	1888....April 15th
1889.....April 14th	

In nearly every instance the plants were examined carefully about a week or two previous to the dates above recorded, hence they could not have been in blossom many days earlier. As the location of plants makes a great difference in the time of flowering all these observations were made at the same or similarly situated localities, namely, sheltered banks with a southern exposure, either near the Crystal Water Co.'s. reservoir, the Black Horse Ravine or the pond near Prince's Bay. The plants in the latter locality are slightly in advance of the others and a week or more ahead of the average.

The following objects were shown: A cannon ball, presumably a relic of revolutionary times, presented by Mr. S. N. Havens, who had dug it up while excavating in the woods not far from the new Smith Infirmary building. A stone axe and arrow head, presented by Mr. M. T. Merrill, which had been dredged from the bottom of the Kills near Lisoleumville. The articles were encrusted with barnacles and Bryozoöns.



PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

April 10, 1890.

Meeting called to order at 8 o'clock

The secretary of the Building Fund Committee reported progress to date. Dr. N. L. Britton stated that an earnest friend of the Association was desirous of having the original scheme of the committee somewhat modified, and, on motion of Mr. Arthur Hollick, the committee were empowered to proceed in the matter at their discretion.

William Winter, Henry Harrower, John Hawley and John Lancaster were elected active members.

Mr. Ira K. Morris presented a brass spur, of Spanish fashion, which was lately plowed up on the Poor House farm, and read the following paper in connection with it:

THE SPANISH SPUR.

This spur was found by one of the workmen on the county farm, while ploughing, in February last. It is composed of solid brass, and the wheel must have originally been at least one and a-half inches in diameter. Much surprise is expressed by Staten Islanders at the finding of a spur of its pattern in such an out-of-the-way place. Yet, it seems possible to trace its simple history.

During the Revolution there stood a small Holland cottage, built of stone and with long, sloping roof, on or near the spot where the County Alms House is now located. The story is handed down to us that it was occupied by a sturdy patriot whose open hatred for royalty and whose unfriendliness to the British soldiers gave considerable annoyance to General Howe, who directed that a guard must be placed upon the premises until some breach should be committed sufficient to cause his arrest.

The mounted patrol of the Island was under the command of Lieutenant-Colonel

Simcoe, of the "Queen's Rangers," and it is said that that notorious officer frequently visited the old cottage, not so much to test the loyalty or watch the movements of its owner, as to enjoy the companionship of his beautiful daughter.

Colonel Simcoe did not dress strictly in accordance with the British army regulations, and I have seen a portrait of him in which he wore the Spanish spur, with its large wheel. Appreciating, as he must have, the superiority of this spur over the small, fine wheel worn by the Englishmen, it is only reasonable to assume that his men were provided with it also. During the exciting period following the earnest appeal of Colonel Aaron Burr to General Washington, to besiege the fortifications on Staten Island, especially at "Richmond town," a detail of Simcoe's mounted men was made daily for many months. Skirmishes frequently occurred near the old cottage, between American troops from New Jersey and the "Rangers" and their native Tory friends.

It was near the close of the war that the severest, and from what we now know, the last skirmish occurred in that vicinity. During a severe storm, and under the cover of intense darkness, a detachment of Americans crossed the Kills, and losing their way, wandered about for some time until attracted by a light in the window of the old cottage. Simcoe's men were lurking about the premises at the time, and listened to the directions given by its occupant concerning the whereabouts of the British soldiery.

As soon as the Americans had departed Simcoe's subordinate entered the cottage and informed the unfortunate man what he had seen and heard, at the same time stating that he had authority to execute him without trial or delay. The man ap-

pealed for mercy until he could acquaint General Howe (who was renowned for his leniency and kindheartedness), of the facts, and the daughter prayed for an interview with Colonel Simcoe, whom she believed would save her father's life. But justice and mercy were unknown among the brutal "Queen's Rangers," from the Lieutenant-Colonel down to the humblest private; yet they well suspected the influence that the pretty girl might exercise under the existing circumstances. As "murder" and "plunder" were ever the watch-words of that infamous organization, there seemed to be no time to lose. The guard drew near, with the exception of the pickets, and with the assistance of ever-willing Tories all the occupants of the cottage were pinioned to their chairs. The husband and father was taken out to a tree, a rope quickly placed around his neck, and in a few seconds he was suspended from a limb and his soul was hurled into eternity. The tree on which this execution took place stood in front of the old "farmer's house" on the county farm, and I once conversed with an old Staten Islander who remembered it well. Decayed and wormeaten it could no longer bear its own weight, and it fell to the ground in a terrible wind storm that swept over the Island about 1827.

The "Spanish" spur, as it is called to-day, and of which this ancient relic is a fair specimen, is not an invention of the Spaniards. In a cumbrous form it bears equal date with the establishment of battle armor, such as was used by the Egyptians considerably more than ten centuries before the Christian era. During the Crusades—the third, if I mistake not—the spur was "re modeled" by order of Cœur de Lion, and made in the exact style of the relic here presented. About two centuries

ago the "changers of fashion" thought it too heavy for light riding, and the English spur, with its small wheel and thin foot-piece, was substituted. In Spain and other European countries, as well as in Mexico and the Western States of our own country, the Spanish spur is used almost exclusively.

Although there is a popular belief to the contrary, it is far less "cruel" than the fine English spur. A horse once well broken to its use need only to hear the familiar "clink," "clink," as his rider paces beside him, before mounting, to go for half a day at a time without necessitating its use.

It is with pleasure that this relic, mystical though its history may be, is presented to the Association. While its true story may never be told, it is nevertheless safe to assume that it played its part in the grand drama that shook the world in "the days that tried men's souls."

The corresponding secretary called attention to the illustrated account of the Indian stone head in the cabinet of the Association, as given in the report of the Smithsonian Institution, Part II, 1886, just received. The loan of the relic was requested by the Smithsonian Institution, shortly after its description in the Proceedings of the Association for May 10th, 1884, and a plaster cast of the same was made which is now in the collection of antiquities in the National Museum.

A specimen of the violet spotted salamander (*Amblystoma punctata*) was shown, in which the tail was bifurcated, each branch being about half an inch in length. It was captured by Mr. John Tynan in the Snug Harbor woods, and presented to the Association.

Adjournment at 9 o'clock.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

May 8, 1890.

Informal meeting.

The Corresponding Secretary stated that his attention had been called only a few minutes previously, through a newspaper clipping, to the sudden death by drowning of Mr. Louis M. Sawyer, a former resident of the Island and one of the earliest and most active members of the Association. Mr. Sawyer met his death at Old Point Comfort while attempting to swim to a boat which had broken loose and was drifting away from a dock in a storm.

The following paper by Mr. Chas. W. Leng was read :

STATEN ISLAND FIRE FLIES.

No one will have failed to notice the abundance on Staten Island of the beetle commonly known as the firefly. As it is seen in early summer, in the words of Longfellow :

"Flitting through the dusk of evening
With the twinkle of its candle,
Lighting up the brakes and bushes,"

it constitutes one of the peculiar charms of our latitude. It has been described by many a poet as well as naturalist and those who have watched it through a warm June night will not wonder that the naturalist, like Mr. Silas Wegg, may be tempted to "drop into werse." No prose can perfectly represent the mazy evolutions of its flight, but the following from the pen of Mr. Philip Gosse will be found the most accurate: "They fly slowly, and as they fly, emit and conceal their light at intervals of two or three seconds; making interrupted lines of light through the air, gleaming slowly along for about a yard, then suddenly quenched, and appearing again at the same distance ahead." He, like Longfellow, compares the light to candles in the woods, indeed he says though told what they were, at every one that appeared, the same idea would come across his mind, but the comparison is not so apt with us, for we rarely see them singly and it rather seems as if they were stars moving through the bushes or twinkling in some deep valley as we look into it from the hills above. They resemble the stars too in the thought of infinite number

they suggest. It would be a hopeless task to count the number one can see in a single summer night. And considering the countless summer nights that have elapsed since the first firefly appeared on the globe (fossil *Lampyridæ* are found in Miocene rocks) the total of all the motions that they have made since then may well suggest a number approaching to mathematical infinity.

Apart from their beauty, our fireflies possess a great interest from the entomologist's point of view, for we find in them some characters specialized to an extraordinary extent. It is unfortunate that among the nine or ten species represented on Staten Island of which I append a descriptive list, the special sexual characters are not developed as fully as in the Southern species and in the English "glow worm." In the latter, the light organs of the female reach their highest point and she is destitute of wings, while the male possesses normal wing power and very large eyes; clearly indicating the relation of the characters to the reproduction of the species. The light organs of the male are feeble, being useless as an attraction to the female, able only to crawl slowly in the grass. The same characters are found in some of our Texan species, but the only approach to it among the Staten Island species is in *Photinus scintillans*, our most abundant "firefly," of which the female is wingless. The eyes, however, and the light organs are equally developed in each sex.

The antennæ also present some curious forms, none more so than those of *Phengodes plumosa*, a southern species whose occurrence on Staten Island was discovered by Mr. W. T. Davis, to whom I am indebted for my specimen. Here the antennæ consist as usual of eleven linear joints, from each of which proceed two branches, as long as the entire antennæ, curved and fringed both sides with long hair. The branches become shorter toward the outer extremity and the effect is very similar to a white ostrich plume. The females of this and all the species of *Phengodes* are unknown. Beyond these characters, the fireflies resemble the general coleopterous form. It is not difficult to catch and examine one

for they frequently rest on a stalk of grass, continuing to give out the intermittent yellow gleam thus guiding one to the spot. In the hand the insect will be found to consist, seen from above, of the thorax in front, a semicircular piece ornamented with rosy patches and a black spot, and two "elytra," parallel yellowish pieces, comprising the greater part of the dorsal aspect. Beneath will be found the head, concealed from above by the hood-like thorax, with biting jaws; the six legs possessed by all beetles; and the abdomen, divided into segments, from the last three proceeding the light which gives the family its name and renown. The light may be watched, throbbing and pulsating as the small creature silently tells that it, like its captor, lives and breathes. If it be crushed, the light still continues for a time but gradually dies away. In the dried specimens, these segments are cream colored. The physical cause of the luminosity in fireflies is unknown. Dr. Lecoute cites some partially successful experiments to isolate the actual luminous substance by Dr. T. L. Phipson and others and the name "Noctilucine" has been applied to it and its existence stated in varied forms of marine life, in Myriapoda and in putrid fish, but I am not aware that positive results have been reached.

The larvae of these insects are also somewhat luminous, and are found in the grass in summer. They are carnivorous and are to be reckoned among the beneficial insects.

The description of the firefly is taken particularly from the species common in gardens and the flight of that insect (*P. scintillans*) is also described, and as Mr. Davis has mentioned to me that the larger species have a more rapid flight, it is proper to so state here to guard against error.

This list of our species includes all known to me from the neighborhood of New York and *Phengodes* is new to the fauna of the vicinity. Being the result of the observations of two persons only, it would be hazardous to represent it as complete, particularly in view of the warm and sandy character of the southern end of the Island, where we may hope to find additions to our list. They may be sought by jarring the leaves and branches of shrubbery where they remain during the day.

LIST OF THE SPECIES OF SUB. FAMILY. LAMPYRIDÆ

Head more or less covered by the hood-like thorax; antennae not plumose;

Head completely covered; 2d joint of antennae small, transverse;

Antennal joints very broadly compressed; color black, sides and apical margin of thorax fulvous, .28-.44 ins. 1 *Lucidota atra*

Antennal joints not broadly compressed;

Eyes small; color black, thorax fulvous with disk and sides black; last dorsal segment in male rounded, .28-.54 ins.

2. *Elychnia corrusca*
Eyes small; last dorsal segment in male bisinuate and truncate; Prothorax with black disk and reddish yellow sides, .25 ins.

3. *Pyropyga nigricans*
Prothorax with black disk and edge, .25 ins

4. *Pyropyga decipiens*
Eyes large; prothorax subcarinate; elytra with wide side margin; Elytra black, margin and suture yellow; thorax like No 2, .30-.50 ins. 5. *Pyractomena angulata*

Eyes large; prothorax not carinate; elytra without wide margin; Larger species; female elytra long like male, .36-.52 ins.

6. *Photinus pyralis*
Smaller species; female wingless, elytra short, .22-.32 ins.

7. *Photinus scintillans*
Head only partially covered; 2d joint of antennae not transverse, as long as 3d

Color dull yellow; prothorax red on disk with a dark medial stripe, elytra dull yellow, more or less striped with black, .42-.60 ins.

8. *Photuris Pennsylvanica*
Head exposed; antennae plumose; Elytra subulate, color testaceous, .50 ins.

9. *Phengodes plumosa*
The length of the insect in 100ths of an inch is indicated before the name. The species numbered 4 and 5 are northern insects and rare with us, and number 9 is as stated above a southern species. The light organs are more feeble in 1 to 5 and more strongly developed in 6 to 8 which are the common "fireflies."

PROCEEDINGS

Comp

— OF THE —

NATURAL SCIENCE ASSOCIATION OF STATEN ISLAND.

June 12th, 1890.

Informal meeting

The Secretary of the Building Fund Committee stated that overtures had been made, on behalf of a prominent educational institution on the Island, looking towards a consolidation of interests with the Association.

At the request of several members Mr. Wm. T. Davis prepared and presented the following memorandum:

The *Hampton Monitor* of May 3d, and, later, other Virginia papers, contained an account of the unfortunate drowning of Louis M. Sawyer. He and his companions, during a storm, finding it impossible to gain the shore, boarded a large boat lying at anchor. In a few moments their little craft was seen drifting away, and Mr. Sawyer jumped to save it, but was overcome by the high running sea, and drowned.

Mr. Sawyer was born in Waltham, Mass., June 24th, 1866 and spent most of his boyhood in his native State. In 1882 he came to Staten Island with his parents, and lived for several years in New Brighton, during which time he was an active member of the Association. He was an enthusiastic Rambler, and the entire collection of stuffed birds possessed by the Association is due to his efforts.

A long list might be made of his adventures while wandering over the Island, many of them consequent upon an almost over earnestness of purpose. He would perform daring and difficult feats of tree climbing; would descend a pumpless well for a drink of water, and at one time was imprisoned in a deep pit near the Serpentine road down which he had climbed in search of mice and other wandering creatures. Many of these risks were taken for his friends, as in the case of the pit imprisonment, which was entirely the result of trying to find something for another. He was a kind, impulsive friend, and if any controversy arose, he would argue his cause with an almost comic seriousness, that would leave no doubt of his loyalty to best principles. The sand dunes at Watchogue, and the lonely spots by the side of the salt meadows, possessed great attractions for him, and if left to decide the course of the days' ramble, he generally chose to pay them a visit.

Mr. Sawyer was an expert caterpillar hunter, and at one time possessed a very good collection of moths, particularly Sphingidæ, which, however, was unfortunately destroyed by fire.

At Lehigh University he studied electricity, and afterward received a first class license from the New England Electric Exchange. In 1889 he was superintendent of the Narragansett Pier electric light station, having previously erected a plant at Rockaway Beach. In November, 1889, he accepted a situation at Troy, N. Y., but soon left for Virginia and installed the Hampton electric plant from the boiler up.

And then, unfortunately, the pleasure trip, the storm, the boat drifting loose and all the attendant circumstances arrived, and May 2d lost to many a sincere and kindly friend.

A preliminary list of the mosses of Staten Island, compiled by Mrs. N. L. Britton, was presented, which will be published as an extra.

Mr. Arthur Hollick showed dried specimens of *Clematis ochroleuca*, collected during the past month at Richmond, which is a new locality for this interesting plant, or perhaps only an extension of the previously known localities on Todt Hill and at Egbertville. It was in great abundance, accompanied, as usual, by *Cerastium arvense*, var. *oblongifolium* in dense clusters, particularly where the serpentine had been exposed. Mr. Hollick also showed staminate catkins of *Salix fragilis*, from a tree in Richmond, which were bi- and trifurcated. This peculiar state of the catkins of this willow was noted some years since on a tree at Prince's Bay, (See *Bull. Torr. Bot. Club*, vi, 312), and it is not unlikely that it may be looked for in other places.

Mr. L. P. Gratacap presented a block of Potsdam sandstone, beautifully ripple marked, from the drift at the base of the bluff on the shore at Tottenville. Also clay iron stone containing plant remains and nodules of pyrite from the same locality, and lignite from the clay beds near Kreischerville.

Mr. Ira K. Morris read the following paper upon "Some Old Staten Island Springs:"

THE OLD STATEN ISLAND SPRINGS.

The highest point of the Island is at the junction of Ocean Terrace and the roadway leading from Castleton Corners to Todt Hill. There have been several springs at that point, but three or four of which remain. Every member of this Association must be familiar with the pretty little lake that nestles there amid the trees and flowers, and we cannot refrain from wondering why the hand of progress has not long ago awakened it from its quiet solitude. I have authority for stating, however, that this is the site selected in 1835 for the erection of the College of Richmond County—an enterprise, alas! that was abandoned in consequence of the memorable bank panic of that eventful period.

In the early part of the present century the site and surroundings of the Seamen's Retreat, at Stapleton, was covered with dense woods, and in that part now a vacant lot, between the Retreat and Vanderbilt avenue, was a magnificent spring. Vivid traces of it remain to-day. In wet periods the line of the outlet is marshy and covered with rank meadow grass. It must have played an important part in the early history of Staten Island, but the story of its past is lost in oblivion.

In the grove, opposite Eckstein's brewery, is a cluster of springs which, at the time of the erection of the Pavilion Hotel, at New Brighton, was selected for the laundry of that establishment. They served it for a number of years; but the chequered career of the old Pavilion is too well known to call forth an explanation of their end of service. It was the excellent water which those springs contained that led to the erection of the brewery at that place. They are still in the service of that establishment.

In Prohibition Park is the most beautiful spring on the Island. The "oldest inhabitant" remembers it well in his boyhood. Throughout the years of the past it has existed in the solitude of the little forest; but its "day" did not come until the Prohibitionists selected it as the central figure of their park. I am informed that water taken from this spring was analysed, many years ago, when public water works were first thought of on Staten Island, and that it was pronounced the purest of the pure. That was about twenty five years before the tests were made for the water works now in operation in New Brighton. During the construction of the road-bed of the Staten Island Central Railroad, an enterprise which was never completed, and fragments of the embankments of which are still to be found in Prohibition Park, this spring did good service. A small army of laboring men encamped near by. This spring will soon be known all over the country. From every State in the Union will come

people to dwell beside it and to drink from its never failing fountain.

About midway between the Alms House and barn, on the county farm, is a noted spring. From time immemorial its sparkling waters have gone rippling through the rocky ditches across the country. Always cool in Summer and never freezing in Winter, generation after generation have ever found a friend in this old spring. It supplies all the water for the cattle and outbuildings of the county farm.

Another spring, and one that makes itself very useful, is located under the embankment by the roadside at Kreischer-ville. How often we have stopped by that old spring, and bade our faithful horse to the rude trough that some kind hand must have placed there in anticipation of just such an emergency as ours! Its waters trickle along the white sand and through the meadows to the Kills, and always look so inviting to the traveler that he involuntarily glances back to it as a "thing of beauty and a joy forever."

Near the Court House station, nestling among the wild cedars and great tufts of Indian grass, is a spring that has done good service. The boys and girls of the long ago used to play in the cool stream that poured out of this spring. It has been used but little of late.

About eighty or ninety years ago, a spring that had been known among all the tribes of Indians at peace with the Raritan, during that tribe's occupation of Staten Island, was located at the junction of Richmond terrace and Bodine street, West Brighton. The cause of its disappearance is not exactly known. It was located on the edge of the burying-ground of the Raritan Indians, and was a sacred spot to those superstitious savages. For generations—perhaps for centuries—the Raritans celebrated their harvest moons by the side of this old spring. It is known that one of the most important councils held by that troubled tribe occurred at this spot. There were present chiefs and less distinguished representatives from the Mobawks, the Delawares, the Mobicans, and no doubt from all other tribes located in what are now known as the Middle States. A story is told of the Raritans that when one of their warriors died, they used to carry his body several times around the old spring, and then, while resting it on the grassy bank, would sprinkle its sacred water on the face of the dead and sing their weird funeral songs. Then, after carrying it around the spring again an equal number of times, in the opposite direction, would convey it off to the burying ground and lay it to rest in the grave. It is also related that the water taken from this spring was carried away by friendly tribes to their homes and long kept as a trophy of the happy re-union and as sacred

pledges of peace. It is remarkable to state that not a person is living on Staten Island today who can recall the old spring except by tradition.

"Logan spring," at West Brighton—so called in honor of the famous Indian chief—is located a short distance northwest of Silver Lake. It flows near Hart Park, through St. Austin's school grounds down to Henderson avenue; through the grounds of the Hon. George William Curtis; thence on through the Bonner and Henderson estates, and empties into the Harbor dyke. For a period—say from 1830 to 1855—it was a favorite resort for picnics and excursions for the Islanders as well as for clubs and societies from the city of New York. There were places for dancing and for the popular games of the period. About 1840, a well was sunk, 102 feet in depth, nearly a mile distant, on the property of Mr. James Davis, and the belief was that the main vein supplying the spring had been "tapped." It was never known to run dry before; but has repeatedly done so since, during a drought. Professor Anthon, who at that time resided near the spring, used to make it one of his favorite haunts. Mr. Mauran, the well-known scenic artist and intimate friend of Commodore Vanderbilt, also resided near this spring, and spent much of his time in Summer in the shady bower that stood beside it. Chief Logan was at one time on most friendly terms with the white people residing on the Island; but his family, while in a boat enroute for their home here, were all murdered, presumably by the whites, and from that time until his death the embittered chief was in open and ceaseless hostility to them. It is claimed by some that his grave is near the old "Peace spring," alluded to above; but it is a matter of dispute, as others think it must have been near the old spring that bears his name.

The Hessian Springs were undoubtedly the most famous of all the water courses of Staten Island. Nobody knows exactly why they were called by that name; but the general belief is that some of Knypbaussen's Hessians encamped beside them and the location was so called to designate that particular military post, which was the chief defence to the mouth of the Kills. The remarkable feature in connection with the Hessian springs, is that our people locate them in at least half a dozen different places. But their exact location, I have good authority in saying, was in the valley which runs parallel with Jersey street, about midway between Henry street and Richmond terrace.

I shall write of the Hessian springs and their surroundings as they appeared in 1834. The main thoroughfare in New Brighton was the Shore road (originally an Indian trail), but now known as Richmond terrace. It formerly ran all the

way around the shore to the old Tompkinsville landing, at the foot of Arietta street. When the Quarantine Hospitals were built, that end of the Shore road was closed, probably because no objections were made. Then, for a time, the only road leading from New Brighton was the thoroughfare now known as Tompkins avenue, but it was then called "the road to Quarantine." At the end of the hospital wall was a pathway leading down to the Shore road; but the first roadway to it was a narrow alley-like one, and is now known as Hyatt street. On the top of the hill, about where the Brighton Heights Reformed Church now stands, there was a narrow lane, which intersected the "road to Quarantine," and led on to the Hessian Springs. That lane is now known as St. Mark's place. It ran diagonally down the steep hillside to the springs from the present intersection of St. Mark's place and Westervelt avenue. The outlet of this lane to the Shore road was about where Mr. Dennis Brereton's office is now located.

The valley leading down to the Kills from the Hessian Springs was quite low, and contained a great deal of water. There was a narrow wooden draw bridge over the creek in front of where Mr. Alfred Wilks' hotel and Mr. Edward Twyford's store now stand, and on each approach of the bridge was a steep embankment. Jersey street was not opened until some time after that—say 1839—and from the shore up to the top of the hill the land was covered with large trees.

Now, glance up the Terrace: After leaving the bridge, until the gun factory was reached, (the present intersection of Lafayette avenue and Richmond terrace), the road was so narrow that only one wagon could pass through it at a time, and if two met at any point within it, one or the other was compelled to back out. There was a high embankment on either side of the narrow road. At the foot of Lafayette avenue, (which was a crooked "trail" running back inland), there was a cove nearly as large as that in front of the Athletic Club House, and at the extreme inner point of this there was a spring which was a familiar landmark. There was another deep cove at the point now occupied by the Snug Harbor railroad station. The Hessian Springs numbered probably eight or ten, and were close together. Immediately below (at a point about opposite the Alert Hose house), a dam was built across the valley, and this formed a mill pond covering between two and three acres. There a large grist mill was built by the New Brighton Association. About 1835, one of the springs undermined a portion of the dam and created a new water course, which is the one now leading from the plush factory to the foot of Jersey street. The mill-wheel

stopped. Back of what is now known as the "Duck Pond" district, were several springs, the water from which ran to Tompkinsville, filled an artificial lake that was located just in the rear of the present County Treasurer's office; thence to a similar lake in the Quarantine grounds (at a point now Central avenue,) and thence into the bay. The owners of the mill at Hessian Springs constructed a deep ditch from one of the "Duck Pond" springs and changed the course of the water from the East to the North Shore, brought it into the pond and started the mill-wheel again. During the hard times that came to the country in "the thirties" the mill proved a financial failure, and was shortly afterward demolished. In the opening and grading of Jersey street, the artificial water course became filled up, and the water resumed its natural course out to the bay at Tompkinsville. Prior to the demolition of the mill, however, it was used as a dwelling place for the army of laborers employed by the New Brighton Association, in grading and widening the streets and making such other improvements as were the order of the day. The old gun factory was used for a similar purpose. The financial "crash" caused a great deal of suffering to those poor people, and it is said they used up nearly all the fences in the neighborhood for firewood. It is a fact not generally known that the people who finally settled in what is now known as "Corktown," in West Brighton, were those who were compelled to leave the old mill and gun factory. Prior to 1834, and for many years afterward, the district which we now call "Duck Pond" was known as the "Boggy Meadows," and was completely covered with water a great portion of the time.

An interesting historical incident occurred in the creek below the Hessian Springs. Gilbert Thompson, a son in law of Governor Tompkins, built a schooner there, (on the spot where the plush factory now stands), in which he placed his family and such personal property as he needed, launched the vessel into the Kill and sailed for Texas, where he joined as an aide-de camp the famous General Houston, and took part in the campaign against Mexico. In the final battle of that war, in which the Mexican commander, Santa Anna, was captured—after he had attempted to seclude himself in a swamp,) he was enabled to escape by the assistance of this same Gilbert Thompson. He, too, was obliged to flee to escape arrest. Mrs. Thompson, however, was captured, and held as a prisoner for some time, with a hope that it would cause her husband to return. This he failed to do and she was released. Santa Anna was re-captured shortly afterward. Gilbert Thompson built and resided in the famous "Marble House" which stood on the site of St.

Mark's Hotel, and which has frequently erroneously been called the "Governor's Mansion."

The famous spring, now almost extinct, located near St. Paul's Memorial Church, and has an outlet beside the old Vanderbilt mansion in Edgewater, (now the residence of Mr. George H. Daly), was one of the earliest landmarks of Staten Island. The Indians named it "the watering place" and succeeding generations guarded it very carefully. Here, from the very earliest days of civilization on this part of the continent, all vessels on going to sea stopped and took on board their drinking water. Tradition says that at first the Dutch sailors held the old spring in such high esteem that they believed its water contained a "charm" to guard them over to the lands far away beyond the restless sea. There are still living a number of old Staten Islanders who well remember seeing vessels anchored off the "watering place," while they filled their tanks and barrels, preparatory to going to sea. But to day the old spring and brook are almost extinct, and we might add, by the present generation unknown or forgotten. The little rivulet through which the water once rippled remains to outline its course; but during the Summer droughts of the past few years we have repeatedly known it to be dry for weeks at a time. This is no doubt due to the destruction of trees and the continual encroachments of buildings.

More than a hundred and fifty years ago one of the London periodicals contained a poem written upon this "Old Watering Place," which is said to have been full of reverence for the spot, and in most pathetic terms described its beauty and its worth. There is a story to the effect that, so well was it known to the English sailors, that it was the first object sought out by Lord Howe's men after their landing on the Island, and there was a pressure brought to bear up that distinguished commander to induce him to establish his headquarters near by it. It is evident that he was more practical than romantic, for he immediately selected the old "Rose and Crown" tavern at New Dorp, for his "place of abode," and stationed a brigade of his most worthless troops—his hireling Hessians—near the old watering place. Nothing could have added a greater indignity to the faithful old brook than this act, unless it be the unpardonable encroachments and negligence of to day, which really seem to have destined it to total obliteration. It is nothing short of a privilege to make a record of its long existence and usefulness for the archives of this association, and to add, late though it may be, by even so rude a pen, a kind tribute to its memory.

The next regular meeting of the Association will be held in September.

PROCEEDINGS OF THE
NATURAL SCIENCE ASSOCIATION OF STATEN
ISLAND.

SPECIAL No. 10.

July, 1890.

PRELIMINARY LIST OF THE MOSSES OF STATEN ISLAND.

The following list has been prepared from specimens collected mainly by Mr. Arthur Hollick and myself during the past eight years. It may be considered as very nearly complete, but additional species should be looked for among the Hypnaceae and the genera *Bryum*, *Barbula* and *Orthotrichum*.

ELIZABETH G. BRITTON.

CLASS I.—SPHAGNA.

- Sphagnum cymbifolium*, Ehrh. Swamps near Garretson's.
S. acutifolium, Ehrh. Swamps near Prince's Bay.
S. subsecundum, Nees. Swamps near New Dorp.
S. cuspidatum, Ehrh. Swamps near Gifford's.
S. cuspidatum, Ehrh., var. *plumosum*, Nees. Watchogue.

CLASS II.—MUSCI.

SUB-CLASS I.—ACROCARPI.

- Polytrichum commune*, L. On the ground, common, sterile.
P. juniperinum, Hedw. On the ground in woods, common.
P. Ohioense, Ren. & Cardot (*P. formosum*, Sulliv., not Hedw.) Clayey banks.
P. tenue, Menzies (*Pogonatum brevicaule*, Beauv.) Prince's Bay and Garretson's.
Catharinia angustata, Brid. (*Atrichum angustatum*, Bruch & Schimp). On the ground, common.
C. undulata (L.), Web. & Mohr. (*Atrichum undulatum*, Beauv.) Common in damp woods.
Georgia pellucida (L.), Rab. (*Tetraphis pellucida*, Hedw.) On decaying wood, Ocean Terrace, Kreischerville and Garretson's.
Fissidens minutulus, Sulliv. On stones in bed of brook, Annadale, and on sandstone pebbles in woods, Todt Hill.
F. taxifolius (L.), Hedw. Common in woods, New Dorp and Prince's Bay.
Mnium cuspidatum, Hedw. On banks by roadsides under trees, common.
M. rostratum, Schwaegr. In wet woods along streams, New Dorp and Prince's Bay.
M. affine (L.), Bland. On the ground, Tottenville and Prince's Bay.
Aulacomnion palustre, Schwaegr. Swamps and low grounds, common. Also in brackish marshes, New Dorp.
A. heterostichum, Br. & Sch. Bloodroot Valley and ravine at Garretson's.
Bartramia pomiformis, Hedw. Shady banks, Prince's Bay.
Bryum Lescurianum, Sulliv. (*Webera Lescuriana*, Lesq. & James). On loamy banks, Todt Hill and drift hills near Richmond.
B. nutans, Schreb. On the ground, Kreischerville.
B. bimum, Schreb. Tunnel at Kreischerville.
B. caespiticium, L. Crevices of rocks and walls, common.
B. argenteum, L. On the ground, common.
B. proliferum (L.) Sibth. (*B. roseum*, Schreb.) On the ground in woods, common; sterile.

Leptobryum pyriforme (L.), Wils. (*B. pyriforme*, Hedw.) On the ground, Kreischerville and Tottenville.

Funaria hygrometrica (L.), Sibth. On the ground, in crevices of stone walls, on ash heaps and burnt patches in woods, common.

Aphanorhegma serrata (Hook. & Wils.), Sulliv. On damp ground, Moravian Cemetery and garden at New Dorp.

Physcomitrium pyriforme (L.), Brid. On damp ground, common.

Webera sessilis (Schmid.), Lindb. (*Diphyscium foliosum*, Mohr.) Todt Hill and Clove Lake, on the ground.

Barbula unguiculata (Huds.), Hedw. On the ground and old walls, common.

B. muralis (L.), Timm. Stone walls near Garretson's.

B. humilis, Hedw. (*B. caespitosa*, Schwaegr.) On the ground at the base of old stumps in woods near Richmond.

Phascum cuspidatum, Schreb. Old fields, New Dorp, common.

Mollia viridula (L.), Lindb. (*Weisia viridula*, Hedw.) On the ground, common.

Astomum nitidulum, Schimp. Old fields, New Dorp.

A. Sullivantii (Schimp.), Hampe. Old fields and garden, New Dorp.

Pottia truncatula (L.), Lindb. On the ground in autumn, New Dorp.

Ephemerum serratum (Schreb.), Hampe. Fields and gardens near New Dorp.

Leucobryum glaucum (L.), Schimp. On the ground in woods, common.

L. albidum (Brid.), Lindb. (*L. minus*, Hampe.) On the ground, Ocean Terrace.

Dicranum flagellare, Hedw. Decaying wood, Prince's Bay and New Dorp.

D. scoparium (L.), Hedw. On the ground in woods, common.

Anisothecium rubrum (Huds.), Lindb. (*Dicranella varia*, Schimp.) On iron soil, Todt Hill.

A. rufescens (Dicks.), Lindb. Clay banks, Dongan Hills.

Dicranella heteromalla (L.), Schimp. On the ground, on banks at bases of trees, common.

Dicranella heteromalla (L.) Schimp., var. *orthocarpa* (Aust.), C. Muell. Prince's Bay and Springville.

Bruchia flexuosa (Schwaegr.), C. Muell. Old fields, New Dorp.

Ditrichum tortile (Schrader), Hampe. (*Leptotrichum tortile*, Muell.) On the ground, common.

D. pallidum (Schreb.), Hampe. (*L. pallidum*, Schreb.) On the ground, common.

Pleuridium subulatum (Schreb.), Lindb. (*P. alternifolium*, Brid.) On the ground, old fields and gardens, New Dorp.

Ceratodon purpureus (L.), Brid. On sandy ground, on shingle roofs and uprooted stumps, common.

Orthotrichum Americanum, Beauv. (*Ulotia Hutchinsiae*, Hammar.) Common on erratic boulders and stone fences.

O. crispum, Hedw. (*U. crispa*, Brid.) On trees, common.

O. sordidum, Sulliv. & Lesq. On red cedars, New Dorp and Richmond.

O. psilocarpum, Sulliv. Old elms near New Dorp.

O. Schimperii, Hammar. (*O. fallax*, Schimp.) On willows and apple-trees, New Dorp.

Ptychomitrium incurvum (Schwaegr.), Sulliv. Old stone fences in shade, near Court House Station and along Springville Road.

Grimmia apocarpa (L.), Hedw. On erratic boulders, ravine near Garretson's.

Thuidium minutulum (Hedw.), Br. & Sch. On decayed wood in swamps, Pleasant Plains, Court House, New Dorp and Woods of Arden.

T. scitum (Beauv.), Aust. New Dorp and Court House.

T. gracile, Br. & Sch., var. *Lancastriense*, Sulliv. & Lesq. On ground in woods, common.

T. recognitum (Hedw.), Lindb. (*T. delicatulum*, Br. & Sch.) On the ground, common; sterile.

T. paludosum (Sulliv.), Rau & Hervey. Swamps, New Dorp and Eltingville.

Leskea tristis, Ces. On *Quercus tinctoria*, New Dorp.

Anomodon rostratus (Hedw.), Schimp. Bases of trees in woods, common.

A. attenuatus (Schreb.), Huebn. On the ground in woods, New Dorp and Bloodroot Valley.

Amblystegium varium (Hedw.), Lindb. (*A. radicale*, Br. & Sch.) On wet logs, Kreischerville.

A. serpens (L.), Br. & Sch. On the ground in wet places, Garretson's, New Dorp, Prince's Bay and Clove Lake.

A. fluviatile (Sw.), Br. & Sch. In a cold spring on stones, West New Brighton.

A. riparium (L.), Br. & Sch. On logs and trees in ponds, common.

A. chrysophyllum (Brid.), De Not. (*Hypnum chrysophyllum*, Brid.) Borders of ponds, Ocean Terrace.

A. filicinum (L.), Lindb. In wet woods, New Dorp and Court House.

Hypnum plumosum, Huds. (*H. salebrosum*, Hoffm.) On the ground, common.

H. rutabulum, L. In well at New Dorp.

H. rivulare, Bruch. In streams at Annadale and New Dorp.

H. pseudo-plumosum, Brid. (*H. plumosum*, Sw.) Ravine at Garretson's.

H. diversifolium, Schimp. New Dorp.

H. Boscii, Schwaegr. On the ground, common; sterile.

H. recurvans, Schwaegr. On trees, Pleasant Plains.

H. serrulatum, Hedw. Tottenville, New Dorp and Egbertville.

H. rusciforme, Weis. On stones in brook, Prince's Bay.

H. micans, Sw. On decaying logs in ponds, Ocean Terrace.

Thelia hirtella (Hedw.), Sulliv. In dense green mats on trunks of trees near the ground, common.

Hylocomium parietinum (L.), Lindb. (*Hypnum Schreberi*, Willd.) On the ground in woods.

H. triquetrum (L.), Br. & Sch. On the ground in red cedar woods, Four Corners.

Campylium hispidulum (Brid.), Mitt. (*Hypnum hispidulum*, Brid.) On the ground, Garretson's and Todt Hill.

Ctenidium molluscum (Hedw.), Mitt. (*Hypnum molluscum*, Hedw.) On the ground in woods, sterile, New Dorp and Todt Hill.

Stereodon pallescens (Hedw.), Lindb. Garretson's ravine.

Stereodon pallescens (Hedw.), Lindb., var. *protuberans* (Brid.), Lindb. New Dorp (W. R. Gerard).

S. curvifolius (Hedw.), Brid. (*Hypnum curvifolium*, Hedw.) In open fields, common; sterile.

S. Haldanianum (Grev.), Lindb. (*H. Haldanianum*, Grev.) In woods, New Dorp.

Plagiothecium denticulatum (L.), Br. & Sch. On the ground in woods, Garretson's.

P. sylvaticum (Huds.), Br. & Sch. At base of trees in damp woods, New Dorp.

Cylindrothecium seductrix (Hedw.), Sulliv. At base of trees in wood, New Dorp.

Entodon palatinus (Neck.), Lindb. (*Platygyrium repens*, Br. & Sch.) In woods at the base of trees, New Dorp.

Climacium Americanum, Brid. On the ground about the roots of trees in wet woods and ditches, common.

Dichelyma capillacea (Dicks.), Br. & Sch. In ponds, common.

Fontinalis biformis, Sulliv. In brook, Prince's Bay, Egbertville and Blood-root Valley.

Hedwigia ciliata, Ehrh. On erratic boulders and old stone fences, common.

PROCEEDINGS OF THE
NATURAL SCIENCE ASSOCIATION OF STATEN
ISLAND.

SPECIAL No. II.

August, 1890.

LIST OF STATEN ISLAND FUNGI IN THE COLLECTION OF THE
ASSOCIATION.

The following list of fungi, in the cabinet of the Association, was prepared from specimens collected from time to time by our members and finally transmitted to Mr. J. B. Ellis, of Newfield, N. J., to whom we are indebted for their determination.

ARTHUR HOLLIICK.
N. L. BRITTON.

BASIDIOMYCETES.

- Agaricus (Collybia) velutipes*, Curtis. On *Ailanthus* stump.
Agaricus (Pleurotus) ostreatus, Jacq. New Dorp.
Agaricus (Hypholoma) sublateritius, Schæff. (probably). New Dorp.
Lentinus Lecontei, Fr. On sweet birch, Clove Lake.
Panus stipticus (Bull.), Fr.
Schizophyllum commune, Fr. On *Ailanthus*, New Dorp; on wild cherry.
Lenzites betulina (L.), Fr. On white oak, Richmond; New Dorp.
Polyporus lucidus (Leyss), Fr. On a dead oak, New Dorp.
Polyporus sulphureus, Fr. On dead wood.
Polyporus obtusus, Berk. (probably). On *Hicoria ovata*.
Polyporus adustus (Willd.), Fr. On *Fagus*. Woods of Arden.
Polyporus applanatus (Pers.), Fr. On *Salix fragilis* and *Quercus alba*.
Polyporus cinnabarinus, Fr. On dead wood.
Polyporus pergamenus, Fr. On dead wood.
Polyporus fomentarius (L.), Fr.
Polyporus betulinus (Bull.), Fr. On white birch.
Polyporus hirsutus (Wulf.), Fr. On *Ailanthus*, New Dorp; on *Castanea*, Richmond.
Polyporus versicolor (L.), Fr. On an old pear stump and dead sticks.
Polyporus conchifer, Schw. On a chestnut log, New Dorp.
Polyporus rimosus, Berk. On locust.*
Mucronoporus gilvus (Schw.), E. & E. On scarlet oak, beech or hornbeam (Bull's Head), and on chestnut.
Dædelea quercina (L.), Pers. On white oak stump, New Dorp.
Dædelea confragosa (Bolt.), Pers. New Springville.
Merulius corium, Fr. On dead wood, Bard Ave.
Fistulina pallida, B. & Rav. On chestnut, Richmond.†
Irpex sinuosus, Fr. On *Ailanthus* and chestnut sapling.
Stercum frustulosum (Pers.), Fr.
Stercum versicolor, Fr. On trees.
Corticium scutellare, B. & C. (probably a young specimen). On alder.
Corticium salicinum, Fr. On alder, Bull's Head.‡
Tremella foliacea, Pers.
Hirneola Auricula-Judæ (L.), Fr. On a chestnut log, New Dorp.
Geaster hygrometricus, Pers. South Beach, on the ground.
Bovista pila, B. & C.
Lycoperdon gemmatum, Fr. (probably). On dead stumps.
Lycoperdon cyathiforme, Bosc. Four Corners.||
Scleroderma vulgare, Fr.

ASCOMYCETES

Valsa (Euvalsa) glandulosa, Cke. On dead *Ailanthus*, old fort at Richmond.

Xylaria polymorpha, (Pers.) On a cherry stump, New Dorp.

Daldinia concentrica (Bolt.), Ces. & De Not. On beech, after fires; on black birch.

HYPHOMYCETES.

Verticillium candidum, Sacc. On black walnut.

MYXOMYCETES.

Trichia chrysosperma (Bull.), D. C. (probably).

The following notes are extracts from the letters of Mr. Ellis, accompanying the specimens :

* "*Polyporus rimosus*, Berk. Yours is just the same as specimens collected in Ohio by Prof. Morgan and determined by Cooke. *Polyporus salicinus* is darker and smoother, margin and all, and does not crack open like this. It is closely allied to *P. igniarius*, Fr. Your specimen is the first I have seen from this region."

† "*Fistulina Hepatica* is credited to this country, and it is not absolutely impossible that your No. 8 is that species. It appears, however, to be the same as I find here, and which Cooke says is the *F. pallida*, B. & Rav."

‡ "No. 12 must be *C. salicinum*, I think. I see no difference between your specimen and mine on willow. Yours is marked 'on alder.' Is it not on willow?"

∥ "*Lycoperdon cyathiforme*, Bosc. . . . When young and white like cheese curd, this species is good eating. Peel off the outer bark, slice and fry it."

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION OF STATEN ISLAND.

September 11th, 1890.

Informal meeting.

The following memoranda were contributed by Mr. Chas. W. Leug :

ADDITIONS TO LOCAL LISTS OF COLEOPTERA.

Dyschirius sphaericollis Say. This species was found by Mr J. C. Thompson and myself at South Beach. The rains, or possibly an unusually high tide, had formed a pool by the roadside with gradually sloping banks, the water being nowhere over a few inches in depth. In these banks the insects were living and by pouring water over them, causing a miniature deluge in their homes, they were persuaded to come out and be caught.

Callida punctata Lec. One specimen found on a knoll on the salt meadows at Garretson's, running on the leaves of the wild lilies that grow there luxuriantly. The *Callidæ* are carnivorous and seek their prey on plants, running swiftly over the leaves.

Anisosticta seriata Mels. One specimen captured by Mr. Davis and myself on a species of golden rod growing on the beach near Giffords. The plants were thickly clothed with plant lice and the *Coccinellidæ* (to which family this species belongs) were well represented; the following six species being noted : *A. seriata*, *Hippodamia glacialis*, *Coccinella 9 notata*, *C. sanguinea*, *Adalia bipunctata*, *Psyllobora 20 maculata*.

Hyperaspis signata Chev. One specimen collected near Old Place. This is one of those *Coccinellidæ* or lady birds with black elytra ornamented with a single red spot on each, which by their similarity are easily confused. The following table may assist in separating them. Of the species included, 1, 4 and 6 only have been found on Staten Island; the others occur

in the vicinity and should soon be found here.

TABLE OF BLACK AND RED COCCINELLIDÆ OF STATEN ISLAND.

Base of antennæ covered by frontal plate; very convex;

Anterior tibiæ with a small tooth on outer margin;

Elytra each with a discoidal spot red; length, .20 inch.

1 *Chilocorus bivulnerus*.

Anterior tibiæ without tooth;

Elytra each with a humeral spot red, and a common elongate spot at the suture; length, .25 inch,

2 *Exochomus tripustulatus*.

Base of antennæ exposed; form moderately convex;

Anterior tibiæ with a strong spine on outer margin;

Elytra each with a red spot in front of the middle; male has head and sides and front margin of thorax yellow; female has head black with an obsolete red spot; length, .12 in.

3. *Brachyacantha indutabilis*.

Anterior tibiæ without spine;

Elytra each with a discoidal rounded red spot; length, .9-.13 inch,

4 *Hyperaspis signata*.

Elytra each with a discoidal rounded small red spot and two minute apical dots yellow; male has head and anterior margin of thorax yellow; length, .8-.12 inch,

5. *H. proba*

Elytra each with three marginal spots yellow and one discoidal spot; legs red and sides of thorax broadly yellow; elytral markings sometimes reduced to a single spot; length, .10 inch,

6 *H. undulata*.

The occurrence of *Cryptorhynchus lapathi* on Staten Island may also be noted. A considerable number were

beaten from a species of willow (*Salix alba*) by Mr. Thompson and myself late in July and again at the end of August when Mr. Davis shared the spoils. The males were scarce on the first occasion but on the second many pairs were taken in copulation. This is a European species and an importation of the last few years only.

Mr. Jos. C. Thompson showed eggs of a snapping turtle and read the following note in connection with the same:

On Wednesday, July 25th, at 11 20 a m., I found, on the railroad about midway between Grant City and Garretsons, a female snapping turtle measuring 1 ft. 9 in. in length, which had evidently been run over by the south bound train leaving Garretsons at 11 07 a m.; as the muscles were yet quivering when found. The turtle had been traveling in an easterly direction and was cut in two leaving the

head, fore feet and a third of the shell between the rails and the remainder of the animal about four feet away. Upon examining this latter part I found eighteen unbroken eggs and the shells of three which had been broken. Out of the eighteen there were but three which were perfectly round and hard shelled—those which would have been deposited first. Each of the others had a round concave spot about $\frac{1}{4}$ in. in diameter, which was softer than the rest of the shell and around which the blood vessels of the oviduct were much larger and more numerous than elsewhere. These eggs, which would have been deposited last, were oblong in shape and the shell was of a leathery texture.

A large block of sandstone containing casts of *Spirifers* was presented by Mr. H. Baruth. The specimen was from the drift near Court House station.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

October 9th, 1890.

Meeting called to order at 8.20 o'clock.

Mr. A. H. Burdick was elected an active member.

The corresponding secretary called attention to the death of Mr. E. W. Stevens, at Orange, N. J., formerly an active and enthusiastic member of the association.

A copy of part fifth of "Homestead Graves" (Special No. 9) was shown, which will be ready for distribution with the current proceedings.

Messrs Arthur Hollick, L. P. Gratacap and Thomas Craig were appointed a committee to confer with the Torrey Botanical Club and arrange for the usual annual field day on Election day.

Mr. Wm. T. Davis read the following memorandum :

Alexander Wilson was the first to describe the yellow winged sparrow (*Ammodromus passerinus*), and in his Ornithology, he speaks of it as breeding on this Island, as appears by the following extract: "It inhabits the lower parts of New York, Pennsylvania; is very numerous on Staten Island where I first observed it; and occurs also along the sea coast of New Jersey. But, though it breeds in each of these places, it does not remain in any of them during the winter." This bird may be seen and its song listened to on the low-lying meadows by the shore and on the grassy hills about Huguenot and in similar situations on the eastern end of the Island, particularly in the pastures near Four Corners. but as yet we have failed to find its nest, as indicated by Wilson.

Mr. Davis also exhibited an egg of the black and white creeper and read the following memorandum in connection with it :

On the 30th of last May, while in the woods to the north-west of Richmond village in company with Mr. Leng, I observed a black and white creeper (*Mniotilta varia*.) hopping down a tree trunk and

holding a caterpillar in her bill. Within a yard of the base of the tree and well hidden in a close clump of beech sprouts and dead leaves, was the nest, containing two young. Later in the day I found another nest near the base of a tree, which was concealed by dead leaves only, being nearly covered by them. A dead branch served as an arch or doorway to the nest, which contained three eggs. These nests were made of dead leaves, strips of bark and grass, and were lined with rootlets intermingled with a very few hairs. Woodland brooks abound in soft mossy masses of roots that are put forth by the trees growing near their beds, and it is probable that the supply of nest lining was procured from the stream near by. Mr. Samuels says in his "Oology of New England Birds," that the nest is "lined with cotton from ferns, soft grass or hair." Nuttall, in the description of the nest found by him, says, "the lining was made of a thin layer of black hair." Black and white creepers have several times been observed throughout the summer, on the Island, but they were particularly numerous during the one just past, and this is the first recorded instance of the nest having been found here.

A specimen of *Lymnaea palustris* was presented by Mr. Davis, with the following memorandum :

A species of fresh water snail was collected some years ago in the brooks flowing into Old Place creek. It was quite plentiful there. The past spring a specimen was handed to Mr. Sanderson Smith, who pronounced it *Lymnaea palustris*, an addition to the list of Staten Island mollusca.

The following objects, presented by Mr. Wm. Olliff, were shown: Fragments of a large decorated Indian pot, two celts or skin scrapers and several examples of concretions—all from Totterville and vicinity. A stone axe, found while digging a trench for gas pipe on Richmond avenue, Clifton, was presented by Mr. James W. Allen.

Mr. Thomas Craig showed plants of *Lemna trisulca*, an addition to the flora of the Island, found in streams in the Clove Valley. Also *Azolla Caroliniana* from the same locality, where it has evidently become thoroughly established since its introduction there by Mr. Samuel Henshaw in 1885. (See Proceedings for Dec. 11th, 1886.)

Adjournment at 10 o'clock.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

November 8th, 1890.

Meeting called to order at 8.30 o'clock.

This being the annual meeting, reports of officers for the past year were read and accepted. The treasurer reported an income of \$168.08 and expenses amounting to \$116.83, leaving a balance of \$51.25 in the treasury.

The recording secretary reported six active members elected and two resigned, leaving a membership of forty three at date.

The corresponding secretary reported that the proceedings of each of the ten meetings held had been prepared, printed and distributed to all members and to about thirty exchanges. The following were added to the list of exchanges during the year :

Colorado College Scientific Society,
Colorado Springs, Colo.

Elliot Society of Science and Arts,
Charleston, S. C.

West American Scientist, San Diego,
California.

Canadian Entomologist, Port Hope,
Ontario

Entomological News, Philadelphia, Pa.

Natural History Society of Glasgow,
Scotland.

Attention was also called to the numerous and gratifying notices and abstracts of the proceedings in various scientific publications and in the local press. On account of serious illness no report was received from the curator.

The Building Fund and Billopp House committees were continued.

On motion it was voted that during the ensuing year the regular meetings of the Association be held on the second Saturday night of each month, except during the months of July and August.

The election of officers for the ensuing year resulted as follows :—President, Dr. N. L. Britton; treasurer, Eberhard Faber; recording secretary, Chas. F. Simons; corresponding secretary, Arthur Hollick; curator, Jos. C. Thompson.

Dr. Britton alluded to his recent proposition (see *Bulletin Torrey Botanical Club*, vol. xvii, p. 121) to recognize plants which, with greater or less frequency, bear flowers of a color other than the normal hue under the rank of "forms," the

difference not being sufficient to class them as varieties. Thus the common salt-marsh pink (*Sabbatia stellaris*), whose flowers are normally red, occasionally produces them of a pure white color and this albino condition was therefore described under the name *Sabbatia stellaris* forma *albiflora*. This form has recently been collected in considerable quantity in the meadows back of South Beach, where it grows with the ordinary red-flowered form, and in certain patches is equally abundant. Another salt marsh species of this genus (*S. dodecandra*), observed by Mr. Eadie at Old Place, and by Mr. Hollick at Kreischerville, has not yet been reported in the albino form from our region, but has been noticed in New Jersey.

The Painted cup (*Castilleja coccinea*), which formerly grew in large quantities in the Clove Lake swamp, but is now to a considerable extent obliterated there, usually produced some plants with orange or yellow bracts, their ordinary color being scarlet. The same occurrence has been reported in other districts.

Some years ago Mr. Hollick collected a plant of the New England Aster (*Aster Novæ-Angliæ*), at West New Brighton, which instead of having the ordinary purple rays had them rose-colored. This had been described by Dr. Gray as var. *roseus*, but it manifestly falls into the rank here alluded to as "forms," and I should propose to call it *A. Novæ Angliæ* forma *roseus* (Gray).

Mr. Hollick exhibited specimens of lignite and pyrite from the recently opened fire clay beds at Green Ridge. This clay has been mined in this locality to a depth of about thirty feet. It is covered by from six to ten feet of drift and is undoubtedly of Cretaceous age, the same as the Kreischerville clays, the two no doubt being continuous. About three fourths of a mile to the eastward, at Fresh Kills, drift clay is being mined to as great a depth, but there is as yet no indication of the Cretaceous clay being near at hand. Both these localities were visited on election day on the occasion of the annual field day with the Torrey Botanical Club and Brooklyn Institute, at which time the specimens were collected. Mr. Hollick also reported that on the same day a new locality was discovered for wintergreen (*Gaultheria procumbens*) near Giffords, where there was a large patch full of berries.

Adjournment at 9.45 o'clock.



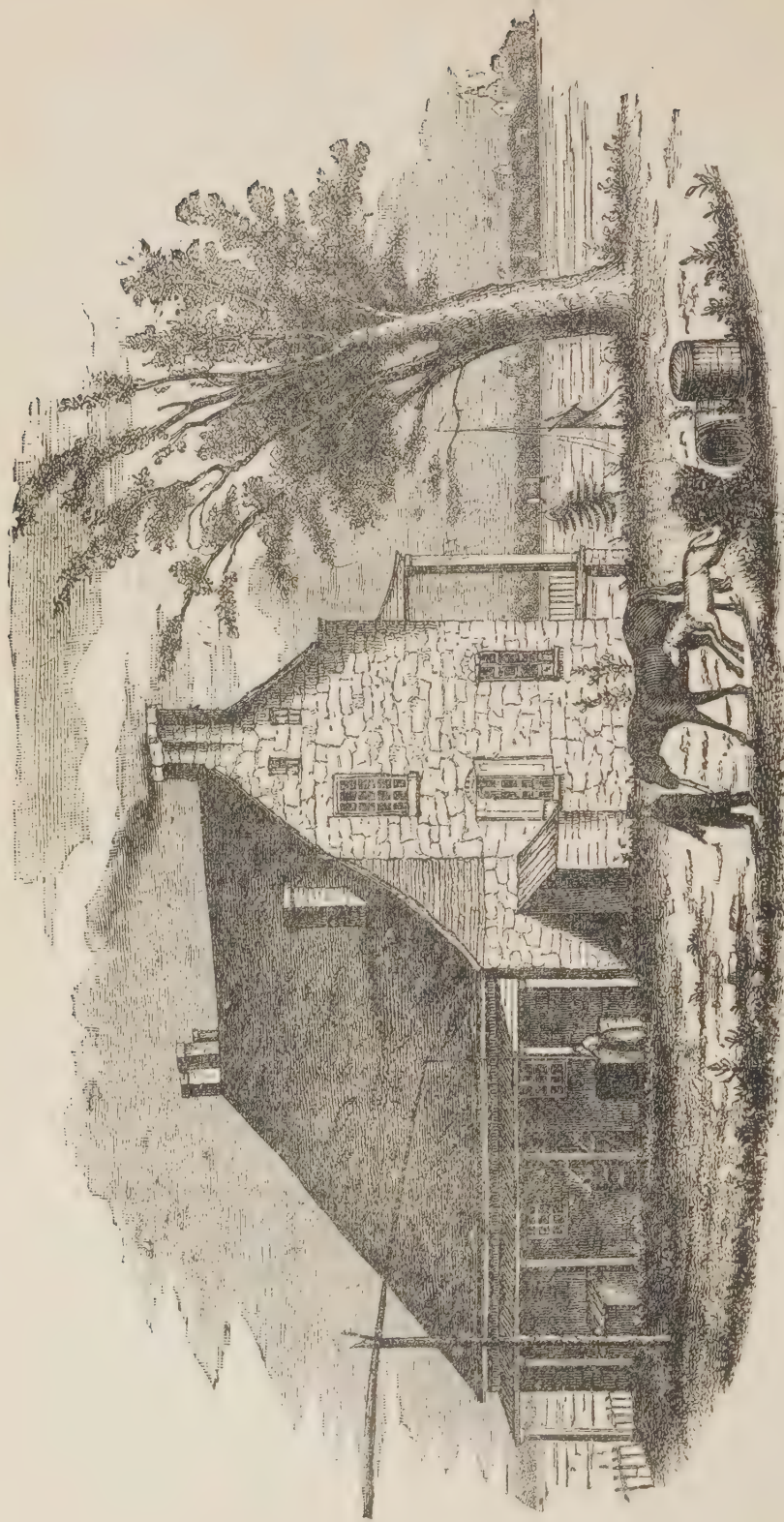
Dec 18, 1890

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.



OLD BILLOP HOUSE, LOOKING TOWARD SOUTH AMBOY.
As it appeared half a century ago.

December 13th, 1890.

Informal meeting.

The Billopp House Committee, through the chairman, Mr. IRA K. MORRIS, read the following report :

THE PRESERVATION OF THE OLD BILLOPP HOUSE :

EMBRACING AN OUTLINE HISTORY OF THE PREMISES, AS WELL AS THOSE WHO HAVE FROM TIME TO TIME OCCUPIED THEM—ITS PRESENT AND FUTURE.

It is considerably more than a year since the committee was appointed by this Association to ascertain if some provision could be made for the preservation of the Old Billopp House, and as so much time has elapsed, it may be proper to state that the committee has not been idle, but has done all within its power to perform its duty. Repeatedly the executors of the late General Lloyd Aspinwall were visited, only to feel each time more forcibly the effects of "the law's delay." Arrangements were made to secure proper legislation, provided we had the privilege to purchase the premises. The chief obstacle, one of the executors informed us, was, that while we desired to purchase only the Old Manor House and the plot of ground upon which it stands, they wanted to sell all the property to one purchaser, in order to close up the estate. Another obstacle, as we thought at the time, was, that a land company had been organized and had made the executors an offer which they were giving their earnest consideration. Yet we did not give the matter up; we merely waited for future developments. The company to which we refer finally made the purchase, and there is every reason to believe that its members have caught the spirit of this Association, and are going to carry out our original programme. It seems at this time to be a matter of congratulation that the Bentley Manor Company has been able to purchase the valuable property, for we can now rest assured that the historical "battle monument," as it has been termed, will be jealously guarded and preserved.

As we cross the threshold of this ancient structure, our minds wander back through the dim avenues of history, and we recall so much that has aided not only to form

the early records of our county, but to lay the very foundation of the nation. We go back to that memorable Summer day when the Island woodlands were clothed in their richest verdure, and the winding trails of the Indian lay amid bowers of wild flowers, now and then leading up to an isolated Holland cottage or a rude cluster of wigwams. We glance across the quiet bay, glistening beneath the noonday sun, and we behold a small sailing vessel, after a tempestuous voyage of many weeks, drawing near to the port at the rude little hamlet of Perth Amboy. We witness, too, the dissensions and the clashing among men which sectional strife and personal interests have caused, until at last a half-fledged monarch places upon it all the strong hand of authority. We see the Duke of York, long before he drew near to the fulfilment of his cherished day dream of ascending the throne of England as King James the Second, deciding the fate of Staten Island; and this old house stands here to day as a monument to the memory of that event. Up to the year 1668 it was a disputed question whether Staten Island belonged to New York or New Jersey, and, tired of the annoyance that this fact gave, the Duke decided that all islands lying in the harbor of New York which could be circumnavigated in twenty-four hours should remain in his jurisdiction, otherwise to belong to New Jersey.

Captain Christopher Billopp, the commander of the little vessel of which we have spoken, undertook the task and was successful. In consideration of this service, the Duke presented Captain Billopp with a tract of land containing 1,163 acres. There and then he built this old house, and named it the "Manor of Bentley," in honor of the vessel which had performed the great task. Most of the material was gathered on the plantation; but the cement, which holds the great thick walls together so firmly, came from England and the bricks from Belgium. Captain Billopp set to work to build the house shortly after he got possession of the land, but he did not receive his deed for the property until 1687. Shortly after his location on the Island he married a sister

of Thomas Farmer, who was a Judge of this county in 1714, and afterward removed to Perth Amboy, where he became a prominent figure in the history of New Jersey. In 1674 a militia company was organized, by order of the King, and Billopp was appointed its second lieutenant. In 1677, while residing in this house, he was appointed commander and sub collector for New York on Delaware bay and river. He is charged with having "misconducted" himself by making "extravagant speeches in public," which were probably offensive to Governor Andros, who deprived him of his military commission. Billopp then retired to his plantation, "there to brood over the ingratitude of princes," as we have witnessed many another doing since Richmond became the "banner county" of the Empire State. He lived in retirement for two years, and we next hear of him joining his fellow citizens in preferring charges against his old persecutor, Governor Andros.

On the 22d of March, 1712, a little baby girl came to the home of the Billopps. They called her Eugenia. She was tenderly reared within these walls, but before she grew to womanhood must have learned only too well the bitter stings of sorrow. We have only tradition now to tell us that her father started to return to England in his little ship, but was never heard from again!

Eugenia married her cousin, Thomas Farmer, and to please those who desired to perpetuate the family name assumed it along with the property, and settled down for life in the Old Billopp House. As Thomas Farmer Billopp he is well known to all readers of history. He became a prominent citizen and held various military and civil offices. It is known that they had two children. The younger, Sallie, married Alexander Ross, of New Jersey, in 1775. The elder, a son, born in 1734, became the famous Colonel Christopher Billopp of the Revolutionary war. Thomas and Eugenia died comparatively young, and were buried in the family grave yard near their old home. It is no exaggeration to say that Christopher Billopp, when even a young man, rose to the rank of leader of men and measures in

Richmond County. He was repeatedly in the State councils and held various offices in the county. We once saw an original order issued by him, at his office in Richmond Village, signed "Christopher Billopp, Chief of Police of Richmond County." That was about 1750. He raised and commanded a regiment of "native loyalists" and was commissioned Colonel by George the Third. His first wife, by whom two daughters were born, is unknown; but his second wife was Jane Seaman, daughter of Judge Benjamin Seaman, of Marshland (now Green Ridge), and the old house in which the marriage ceremony was held was demolished four or five years since. It stood by the Fresh Kill road on Mr. George W. White's dairy farm. We once chatted with an aged colored woman who informed us that her mother was a slave in the Seaman family, and witnessed the marriage ceremony. Time does not permit us now to review the long and interesting record of this noted man. Suffice it to say, he was true to his convictions in supporting the parent government, and in this old home of his ancestors entertained many distinguished men in the service of the Crown. After the war, he left Staten Island with a portion of his family, and in 1783, with fifty-four other Royalists, petitioned Sir Guy Carleton for extensive grants of land in Nova Scotia. He soon went to New Brunswick and became prominent in the affairs of that province. He was a member of the House of Assembly, the Council, and on the death of Governor Smythe, in 1823, he claimed the Presidency of the government, and issued his proclamation accordingly; but the Honorable Ward Chipman was a competitor for the position, and was sworn into office.

Colonel Billopp died at St. John, N.B., in 1827, being then in his ninety-third year. His wife, twenty years his junior, died in the same city in 1802, aged forty-eight years. They had three sons—John, Willett and Thomas. They had a dry goods store on Broadway, New York City, in the vicinity of Trinity Church. John never married, but fell a victim of yellow fever at the time the city was scourged by that terrible disease. Thomas married a Miss Moore, of Newtown, L. I., survived

the fever, failed in business, joined the expedition of the celebrated Miranda, in which he received an appointment as captain, and was taken prisoner by the Spaniards and afterward executed. There were four daughters by the second wife. Louisa married John Wallace, Esq., surveyor of the customs. Mary married the Rev. Archdeacon Willis, of Nova Scotia, and died in Halifax in 1834, aged forty-three years. Jane became the wife of the Hon. William Black, of St. John, and died in 1836. Ann, the youngest daughter, never married. It is said by old residents of the Island that she was the last of the family to visit the dear old homestead. She went there in 1824 and gathered some flowers from an old trumpet creeper vine that was growing on the house, and some nuts and wild cherries from trees that were growing in the burial plot, and took them with her to her father in Nova Scotia. It is said that on beholding them the heart of the old Colonel melted and he wept like a child.

The Billopp estate was confiscated at the close of the Revolution, and was sold by Isaac Stoutenburg and Philip Van Courtland, Commissioners of Forfeitures for the Southern District of New York. The sale, made on July 16th, 1784, was recorded as follows:

"Sold to Thomas McFarren, of the city of New York, merchant, for the sum of four thousand six hundred and ninety-five pounds Lawful Money of the said state—All that certain Tract or parcel of Land situate Lying and being in the County of Richmond and Manor of Bentley, Bounded Southerly by the Bay or water called Prince's Bay, westerly by the river that runs between the said Land and Amboy Northerly partly by the Land of Jacob Reckhow and partly by the road and Easterly partly by the road and partly by the Bay, Containing Eight hundred and fifty acres and half an acre and which said tract is divided into the several following Farms and Lots of Land—three hundred and seventy-three acres thereof in possession of Samuel Ward—Two hundred Acres in the possession of Albert Ryckman, Fifty-three acres in the possession of John Manner—Fifty-three acres in the possession of Andrew Prior—Twenty-five acres in the possession of James Churchward, sixty-seven acres and a half acre in the possession of Benjamin Drake—Twenty three acres and a half acre in the possession of Joseph Totten—Eleven acres and a half acre in the possession of

Jacob Reckhow—Together with all the Buildings and Improvements thereon Erected and made Forfeited to and Vested in the People of this state by the Attainer of Christopher Billopp late of the County of Richmond Esquire."

There is a lamentable incident in connection with the history of these premises. At the time that the property passed into the possession of the Aspinwalls the sacred ground of the old grave yard was heartlessly trespassed upon, and the mouldering bones of three generations of the Billopps—together with those of many a faithful old slave, and perchance some friendly Indians—were taken from their long resting place and carried away to a neighboring garden. The old brown stones, too, that had long marked the silent homes of the dead were carried away, and the little plot which for nearly two centuries had held the mortal remains of dear ones was thrown open to the commons. That such an act should have been committed in "our day" is a sad reflection upon our boasted civilization, and in the light of history resolves itself into an actual crime.

Forty-three years ago, while that part of the property originally purchased by the Wards belonged to a Mr. Parkinson, who had purchased it in 1836, Mr. Richard Christopher with his wife moved into the old house. There they have lived ever since. When the Bentley Manor Company took possession of the property, they permitted Mr. Christopher and his aged wife to remain, and he is employed to show the visitors through the rooms and explain to them what he knows about the old house and the noted people who have made it their home. The kind old man, whose hair is silvered with age, evidently feels very proud of his responsible position and performs his task to the best of his ability.

Accompanied by the general manager of the Bentley Manor Company, Mr. Richard S. Satterlee, we visited the house on Saturday last, (December 6th), and, with Mr. Christopher as guide, we went through every room and closet within it. There is the large hall in the centre of the building, apparently in its pristine condition. Mr. Satterlee has fitted up a little desk, where he keeps a register, and, on glance

ing over its pages we find the names of visitors from California, Pennsylvania, New York, Connecticut, Florida, Rhode Island, Wyoming, Illinois, Washington, Michigan, and so on. Resting against the wall, on the right of the entrance, are the two famous brown headstones that have been familiar to every generation of Staten Islanders for considerably over a century. One stone had on it the old fashioned death's-head and is badly nicked and bears this inscription: "Here lies ye body of Thomas Billopp, Esq., ye son of Thomas Farmer, Esq., Dec'd April ye 2d, 1750, in ye 39th year of his age." The other is badly broken and several of the pieces are lost. About eight years ago, in company with Mr. Frederick W. Kost, the artist, the writer gathered up the fragments of this stone, which we found lying scattered around the yard, and placed them together, hoping that some day we would have authority to remove them for safe keeping. But Mr. Satterlee has cemented the pieces together, placed them on some boards, and the stone once more stands beside its old companion. It bears this inscription: "Here lies Eugenia, ye wife of Thomas Billopp, aged 23 years, Dec'd November ye 23d, 1735." The old stones are a matter of much historical importance to all who visit the house, and are the indisputable proof-links in the genealogy of the Billopps.

We next visited the old kitchen. There is the great fire place, really large enough for half a dozen men to stand in at a time, while at its back is the huge oven of which so much has been written. And there, too, it is remarkable to state, is the original iron trammel, and hanging to which are all the hooks and chains that were placed there more than two centuries ago. Above this, on the thick walls of the chimney, are the hooks on which, in days of yore, they used to hang their meat for smoking. The kitchen is in the low part, which also contains a sitting and dining room. There is a unique corner cupboard in the kitchen which formerly stood in one of the large front rooms. It bears evidence of once having been a receptacle for silver and other valuable wares.

A curiosity is the inside stairway to the basement. Little and big steps lead at right angles down into one of the most

unique spots imaginable. Above are the great whiteoak beams, so hard that it seems impossible to penetrate them with a knife blade, and they rest on a foundation of huge stones about four feet in thickness, and held together by a flint-like cement. In this old basement is laid one of the scenes in "The Water Witch," one of Fennimore Cooper's novels. The floor is of brick, and close beside the main entrance is a fire-place that compares with the one in the kitchen. This basement, there is every reason to believe, was originally used as a kitchen. In the rear of it—or rather, on the North side—is located a strange, dungeon-like cellar, which, tradition tells us, was used for imprisoning many a patriot of the Revolution, while the Billopp House was a British outpost. The theory has been advanced for many years that there was a secret subway from the basement down to the river, about two hundred yards distant. After the investigation on Saturday in "the dungeon," we think it is but fair to believe this theory. "Soundings" taken in various parts of the floor go to prove that there is a hollow place underneath.

The room on the right of the entrance to the main hall is undoubtedly the old parlor. It is the room, we believe, in which the famous interview was held between Lord Howe and John Adams, Benjamin Franklin and Edward Rutledge, shortly after the battle of Long Island. Lord Howe desired to dictate terms of peace, and the Continental Congress had appointed those men to learn what he had to say. Shortly after the capture of Colonel Billopp, and during his imprisonment in the military jail at Burlington, N. J., his family removed from the old house, never to return. From that date on to the evacuation of the Island by the British it was used as a barrack by General Howe's troops. It soon became very filthy, and on this occasion the room in which the interview was held was cleansed by order of the post commander, presumably Lieutenant-Colonel Wallace, of Colonel Billopp's regiment. Along the sloping lawn in front of the house long lines of troops that formed the very flower of the English army were drawn, between which the dis-

distinguished commander escorted his no less distinguished guests. We need not here repeat the events of this memorable hour, though it may have aided to form one of the most interesting pages in American history. We all know that Lord Howe's terms were rejected. Writing of the event many years afterward, the late G. P. Disosway said: "The momentous interview at the Old Billopp House, between the old world and the new, was an event regarded with extreme solicitude by the people of both at that day. With the developments of time, it rises into the grandeur of a great battle-point and monument of history. The interview was brief. There was no agreement, no reconciliation. Independence was maintained. The result was limned by the hand of God, and is seen in the progress of a continent and the achievements of a century all over the world." The room is now totally devoid of furniture, save two old portrait paintings of Joseph Christopher and his wife, who were the host and hostess of old Richmond County Hall, in Richmond Village, about a half a century ago. The ancient fireplace is used to warm the welcome visitors, and the "back-logs" crackle and snap as of yore. The mantle is well covered with relics which Mr. Satterlee has collected about the premises, among which are bullets and various Indian implements. During a recent reception given to the public in this room several valuable relics were carried away. The rude closet in one corner of this room is in itself worthy of a visit.

On the opposite side of the hall is what is generally believed to have been the dining room during the times of the Billopps. It was originally a very large room, but was divided by Mr. Christopher. One can easily picture in his mind some of the gay banquets that have been given in this old room; can imagine the powdered wigs and rich costumes gathered together in those old days at Bentley. What a charm they add to the willing imagination as the scenes come back to us only in the faded glory that serves to enchant the memory of the past.

On the second floor the rooms are naked and empty. There have evidently been no material changes in them during the two

long centuries. But they are indeed a study within themselves. How many a soul has "dreamt through the curtain'd sleep" in those old rooms that now sleep a deeper slumber in the ground! Plain, simple, rich with age and embellished with history—that's all that can be said of them here. There were originally three rooms on the second floor, but there are four now.

The old garret—shades of boyhood, what reveries fill the mind up there! The strong whiteoak beams, morticed and braced in every direction, hard and firm with age, covered with great, long shingles that were undoubtedly the first to form the roof—how many have they protected from the sun, the wind and the rain! The old "slave quarters" on the North end of the floor were torn away many years ago, and the garret is now one large room. For at least one hundred and fifty years the slaves of the Billopps, the Waids, and other masters slept in that old garret. During all that period Westfield contained more slaves than any other town in the county, and as the lord of the Manor of Bentley was always considered its leading as well as its wealthiest citizen, there is no room for doubt that the number of slaves there exceeded that of any other property holder on Staten Island. The roof is badly out of repair, and the snow and rain beat through in many places. That will no doubt be looked after by the enterprising gentlemen into whose hands the old house has fortunately fallen. Among the superstitious there is an ill-founded tradition that a murder was committed in this garret some time prior to the Revolution; but as there is nothing in the Court records to substantiate the statement, we can put it down as one of those flimsy myths that almost always hover over the moss-covered walls of old buildings of this class.

The old house will need many repairs soon. The old doors and windows that were in service at the commencement are still there, but they are greatly worn, and in many places about the house there are evidences of the devastation and ruin of moth and rust.

Differing from the rule prevailing in recent years, a warm welcome greets the visitor nowadays. A cordial

invitation is extended to everybody the wide world over. And it is a matter of congratulation that the general manager of the company, Mr. Richard S. Satterlee, is a gentleman of education and refinement, full of veneration for the old house and its history, enthusiastic in the collection and preservation of relics pertaining to it, and is determined to do his part to keep the ancient land-mark for the delight and entertainment of even generations yet to come.

In an attempt to place the grounds surrounding the house in good order, evidences have been discovered to substantiate the theory that it once stood in the centre of a park. On both the North and South sides the foundations of stone walls that enclosed it were found a few days since. During the coming Spring the grounds will be neatly arranged. The well, with its "old oaken bucket" and "sweep" will be preserved with care. Its sparkling water and unique arrangement throughout will add a real charm to the scene.

The Bentley Manor Company has had the property surveyed and laid out with regard to convenience of access, advantageous sites for residences and im-

proved methods of drainage. The property is divided into blocks of various shapes and sizes. The company offers the property for sale for purposes of residence only.

The land will be sold in plots, containing any number of lots, under such restrictions as will secure it from the introduction of any objectionable tenants or features. However, land will not be sold for speculation, and only those who intend to build will be encouraged to come. The character of the houses built will be controlled to a certain extent in so much as on certain streets and avenues single lots will not be sold, and any one purchasing in those localities will be expected to erect a house the minimum value of which shall be in keeping with the situation and neighboring houses. No liquor will be sold on the premises, and nuisances of all kinds will be excluded by the terms of the deed.

So, after all, the Association need not feel that its work has been in vain. The effort to preserve the old house was a very laudable one, and we should feel thankful that while the task was not performed by our hands it will be done by others, and will be done well.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

January 10th, 1891.

Informal meeting.

Mr Arthur Hollick read the following notes upon additions to the flora of the Island, illustrated by specimens:

Since the last appendix to the Flora of Richmond County was published, about two years since, a number of important finds have been made. Some of these are of plants not previously found on the Island, others are of plants which had been previously reported but not verified by specimens, while others are of importance as new localities for rare species. I take pleasure in acknowledging our indebtedness to the members of the Torrey Botanical Club, who are responsible for seven of the finds, discovered during several field day excursions to the Island.

Ranunculus lacustris, Beck & Tracy. Abundant in a pond on Ocean Terrace near the Vanderbilt Mausoleum; only known previously from a pond near Court House Station.

Tilia Americana, L. Richmond. (Wm. T. Davis) These trees were discovered May 30th, 1888, but it was not until the following year that the flowers were obtained and the species positively identified. The trees are few in number and grow in the woods near the defunct North and South Shore R. R. So far as we know they are the only native Lindens on the Island.

Euonymus Europæus, L. Escaped along a roadside near Richmond Valley.

Eupatorium hyssopifolium, L. Pleasant Plains.

Aster radula, Ait. Arlington. (Dr R. G. Eccles.)

Hieracium aurantiacum, L. Rossville; in grassy ground, near the shore.

Veronica Chamædrys, L. Princes Bay. (Mrs. N. L. Britton.)

Salix purpurea, L. Abundant along roadsides near Rossville. Probably the relics of old basket-willow plantations.

Habenaria ciliaris, (L.) R. Br. Old Place, (Wm. T. Davis), and Bogardus' Corners

Habenaria blephariglottis, (Willd), Torrey. Arlington. (Dr. R. G. Eccles.)

Microstylis unifolia, (Michx.), B. S. P. Near Egbertville, (Mrs. N. L. Britton,) and Ocean Terrace, near Four Corners. This inconspicuous little orchid has recently been found in comparative abundance at both localities and may probably be looked for in similar situations elsewhere. It was admitted into the original "Flora of Richmond County," published in 1879, upon the strength of a single rather poor specimen found by Judge Addison Brown "in a glen near New Dorp," and until another specimen was found by Mrs. Britton about three years ago this was the only voucher which we had to show as evidence of its occurrence here.

Liparis Læselii, (L.) Rich. Garrettsons; one specimen only. (Miss Millie Timmerman.)—This species was admitted into the original catalogue on the authority of I. H. Hall, in the Bulletin of the Torrey Botanical Club for April, 1874, where there is a note to the effect that it was found "on Staten Island, in the gravelly bank of a railroad cutting."

Cypripedium acaule, Ait. forma *alba*. A single specimen of this albino was found by Mrs. Edward Heylyn. The exact locality is not known to me.

Belamcanda Chinensis, (L.), Red. Totentville; along a brook.

Tradescantia Virginica, L. Bogardus' Corners. evidently spreading.

Eleocharis palustris, (L.) R. Br. var. *glaucescens*, (Willd.), Gray. Common.

Scirpus Olneyi, Gray. New Dorp.

Glyceria distans, (L.), Wahl. New Dorp.

Panicum miliaceum, L. Todt Hill road, near Moravian Church.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

February 14th, 1891.

Meeting called to order at 8.20 o'clock.

The report of the Billopp House Committee, as read at the December meeting, was approved.

The annual report of the Curator for the year ending November, 1890, was read and accepted. The donations to the collections numbered 24; to the library 21, and the publications received in exchange for the Proceedings numbered about 200.

The resignations of Samuel Henshaw, Geo. Babcock and Geo. J. Hicks were read and accepted.

On motion the president appointed Thos. Craig, L. P. Gratacap and A. H. Burdick a committee to consider and report upon some scheme for increasing the membership of the Association.

The following communication was presented by Mr. L. P. Gratacap :

For a few days about February 6th the water of the S. I. Water Supply Company was turbid, and delivered a fine sediment, which blackened the bottoms of the receptacles in which it was used. Much of it settled at once, but the finer particles sank only after standing for a considerable time. In view of some complaint as to the condition of the Edgewater supply and the importance always attaching to the sanitary state of drinking water, an examination was made of the sediment collected towards the end of the period during which the water was in this irregular condition. The sediment, under a quarter inch objective, appeared in small blurred clots, which were opaque, except at points where shining particles were observed. Interspersed amongst the clots were angular fragments which were transparent. A very few bleached shreds of algæ were seen, and no other organic bodies were present. In polarized light the clear particles were revealed as quartz sand. The clots remained undetermined,

but suggested clay grains. Treatment with nitric acid produced no coloration, but failed to dissolve the now minutely subdivided elements of the muddy residues. Gathering these under the microscope showed a net of reddish particles, which blackened upon drying. Fusing with nitrate of cobalt did not show alumina, as was expected. It is altogether probable that the reaction was entirely masked by other earthy oxides. The nitric acid solution reacted for iron, and exhibited a strong turbidity with nitrate of silver, indicating chlorides. The water subsequently taken from the pipes showed almost no reducing power upon permanganate of potash, but also a still considerable chlorine reaction. The results show that the fouling of the water at the period referred to afforded no justification of any alarm, the foreign admixture being probably due to the mechanical introduction of dirt incident upon the mending of pipes, stoppage of leaks, or other necessary repairs; but the reaction for chlorine, if continuously excessive, is not perhaps to be so lightly regarded. However, the language of Wanklyn may be wisely recalled. He says (Water Analysis p. 24): "I am of opinion that too much stress has been laid on the chlorine in drinking water, inasmuch as it is by no means rare to find an excessive quantity of chlorine in very pure water; and I know that, by reason of the chlorine, pure water has been condemned by water analysts." It has been shown in these proceedings that freshly precipitated rain-water may react very strongly for chlorine. (Proc. N. S. A., S. I., March 14th, 1885) Taken in connection with the absence of any reducing influence of the water upon permanganate of potash, the presence of chlorides scarcely warrants any suspicion of pollu-

tion; the reaction itself may have been unusual and temporary.

Mr. W. T. Davis showed specimens of Linden trees (*Tilia Americana*) and read the following memorandum in connection with them :

Last August and September I came upon two clumps of American Lindens, at a distance from the locality mentioned in the January proceedings. The location of these trees may be mentioned briefly as follows : A considerable clump along the banks of the brook that rises near the Egbertville road and flows immediately north of the range of Serpentine hills to Richmond creek, and a smaller clump, on the hill side, at the edge of the woods, about one quarter mile from the West-corner of the Springville and Port Richmond roads. These trees are located on contiguous water-sheds

Mr. Davis also contributed the following notes :

In Vol. V., No. IV., of *Entomologica Americana*, a list of the Orthoptera found on Staten Island was published, to which the following species are additional :

Tridactylus apicalis, Say. May to September. Not uncommon at Watchogue, in damp places. A number were seen by Mr. Leng and myself on the wet sand by Old Place brook, and their small size and marvellous agility made them most entertaining insects to capture. This power of leaping is so great that they seem to disappear quite mysteriously, and one wonders which way they have gone, it being seldom that their departure can be accurately followed by the eye.

Phyllocirtus pulchellus, Uhler A single female of this species, was found near Old Place, on the 3rd of September last year. It was crawling on a horizontal limb of a sweet-gum tree, about twenty feet from the ground, where its collector had climbed to get above the mosquito line. In describing the species Mr. Uhler mentioned a single specimen from the vicinity of New York, but it is more common Southward.

Tettix triangularis, Scudder. Two specimens have been captured on the Island,

one in May and the other in August, and one of them was sent to Mr. Scudder for identification.

Labia minor, Linn. I have taken it on the Island in May; it has also been captured by Mr. Thompson.

With these additions, the species of Orthoptera now known to the Island number sixty-seven.

A memorandum from Mrs. N. L. Britton was read, giving *Barbula papillosa*, Muell., as an addition to the list of Staten Island mosses published last July, at which time it was predicted that "additional species should be looked for among * * * the genera *Bryum*, *Barbula* and *Orthotrichum*." The specimens were found by Mr. Wm. T. Davis on red cedar trees at New Dorp.

Dr. N. L. Britton showed leaves of silver maple infested by a black fungoid growth, which was determined by Mr. J. B. Ellis to be *Rhytisma acerinum*, (Pers.) Fr. So many maple trees on the Island were affected last year that considerable notice was attracted to it, and information sought in regard to the matter. Dr. Britton called attention to the peculiar radiating ridges on the surface of the fungus.

Mr. Jos. C. Thompson noted the capture, last December, of *Hydrocanthus irricolor* and *Hydrophilus nimbatus*, in a pond, under four inches of ice. Mr. Thompson also called attention to the fact that the first injection of Koch lymph had recently been given on Staten Island, at the Smith Infirmary, by Dr. J. J. Van Rensselaer, and suggested that it might be a matter of sufficient scientific importance and interest to place upon permanent record.

A piece of Helderberg Limestone, collected by Mr. Arthur Hollick from the drift on Fort Hill, was shown by Mr. Gratacap. The specimen contained poorly preserved fossils, representing *Spirifera perlamellosa*, *Orthis sub-connata* and *O. oblata*, with possibly a *Streptorhynchus* and a *Rhynchonella*, too obscure for determination.

Adjournment at 9.45 o'clock.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

March 14th, 1891.

Informal meeting.

The following paper was read by Mr. Chas. W. Leng :

NOTES ON SOME SPECIES OF DONACIA.

It has been my task during the past few months to make a revision of the genus *Donacia*, in the prosecution of which I have, with the assistance of my fellow coleopterists, Messrs. Davis and Thompson, collected considerable numbers of those species inhabiting Staten Island. Their specific identity has thus become known to me and certain facts respecting their habits, which have not been elsewhere definitely recorded, seem to be proper matter for these proceedings.

There are about twenty species inhabiting the United States and Canada, of which five only are known to occur here. It is possible, however, that additional species may be found by sweeping damp meadows with a net in June and July, a method not adopted by us last year.

The genus is quite homogeneous and the species are indeed so much alike that most collections are in some confusion. The body beneath is more or less flattened and densely clothed with decumbent hairs, lustrous and resembling silk or satin according to the fancy of the describer. These hairs serve as a protection against the moisture to which their pond-frequenting habits expose the insects. The color above varies from coppery bronze to testaceous, more or less mottled with green metallic. The length is about half an inch. The antennae and legs are comparatively long and the variation in the length of the joints of the one and in the spinous processes which adorn the other afford the most convenient characters, combined with the form of the elytral apices, for the separation of the species. They may be known as follows :

Prothorax not tuberculate, scarcely punctulate;

Third joint of antennae little, if any, longer than second;

Elytra squarely truncate, *lucida*.

Third joint of antennae at least twice as long as second;

Elytra squarely truncate, *palmata*

Elytra more convex, subtruncate, *piscatrix*.

Prothorax not tuberculate, coarsely, densely punctate;

Third joint of antennae little longer than second;

Elytra squarely truncate, *subtilis*.

Prothorax evidently tuberculate, scarcely punctate;

Third joint of antennae little longer than second;

Elytra more convex, subtruncate, *tuberculata*.

In addition to the above, the sexual characters assist in separating the species. All the males have the last dorsal segment, called the pygidium or podex, short and truncate; the females have the same part longer and rounded at apex. The male of *lucida* has the posterior femora spinose, often armed with two or three spines; the female has but one spine. The sexes of *palmata* and *piscatrix* differ similarly in the femora; the male *palmata* is further distinguished by a dilation of the first joint of the anterior tarsi and the male of *piscatrix* by an excavation of the first ventral segment. The sexes of *subtilis* differ but little; both have the posterior femora unidentate. The male of *tuberculata* has one spine, but the female is without any.

From the results of last season's collecting I am satisfied that the above described species affect different aquatic or sub-aquatic plants; the first three appertaining to the water-lilies, *subtilis* to the rushes

growing at the pond margin and *tuberculata* to the *Sagittaria*. The evidence I have is as follows: Our collections were made principally at Britton's ice pond, at the small pond on top of Todt Hill and at Butler's or Galloway's pond near Garretson station. In all of them the yellow water lily grows abundantly mingled with the white water lily, but only at Butler's pond do gradually shelving banks afford the marshy stretch necessary to a free growth of the rushes. At all of these ponds the first three species of *Donacia* were abundant but only at Butler's did we find *subtilis*. At that pond were many specimens, some resting on the lily pads but the greater number on the stalks of the rushes. (Identified by Mr. Arthur Hollick as *Juncus effusus*, L.) Mr. C. M. Weed, in the Bull. Ohio Ex. Stat., Oct., 1889, describes the abundance of *subtilis* in a similar situation near Columbus. My friend, Mr. E. M. Hulbert, tells me it is abundant near New Britain on sweet flag, and "no water-lilies within a mile and no other species found."

In regard to *lucida*, *palmata* and *piscatrix*, all three have been taken often on the leaves of the lilies and within the flowers, and there is a further confirmation of their lily-frequenting habits derived from an observation of the roots of that plant. In the operation of cleaning the ponds for winter, the icemen drag out the ranker growth of lilies and throw them, roots and all, on the banks. I have found in November oval cases of a thin but tough material attached to these roots and containing *Donaciae* in the imago and larval stages. These cocoons are waterproof and enable the beetle to pass the Winter under two or three feet of water or perhaps, when near the bank, imbedded in ice.

The larvae of our American *Donaciae* have not been described and though I have dried specimens I cannot venture to make

a complete description. They appear to be whitish grubs about half an inch in length, with the head darker but not otherwise conspicuous. The body appears to taper slightly beyond the head.

I have searched about the plants inhabited by *subtilis* for similar cocoons, but hitherto unsuccessfully. Many of the stems are now eaten possibly by its larva and among the roots are empty cases, but these might have been washed up from the pond.

The last species, *tuberculata*, is known to us on Staten Island by a single specimen taken on *Sagittaria*. It was, however, taken in numbers by Mr. Davis and myself in the cranberry bog at Jamesburg, N. J., on the same plant. Water lilies occurred a few hundred yards away, and on their leaves were a few specimens of *lucida*, but on the *Sagittaria* only *tuberculata*.

The life history indicated by these observations is certainly a curious chapter in coleopterology. The parent beetles hover about the food plant proper for their offspring. They lay thereon their eggs and the larvae hatching, eat and grow fat until the approach of Winter warns them to prepare the waterproof case for their coming transformation, within which the perfect insect develops and lies dormant until the following Summer, when he emerges to repeat the cycle. It is, of course, no more than all the butterflies do, but possesses a special interest from the accompanying adaptation to an aquatic career.

Mr. Arthur Hollick presented a specimen of soapstone rock from the Clove road outcrop showing well preserved glacial striations or possibly "slicken-side" markings, neither of which had been previously noted from such rock, probably on account of it being so soft and easily weathered.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

April 11th, 1891.

Informal meeting.

Mr. Ira K. Morris called attention to the fact that the grave of the late Commander Timothy G. Benham, in St. Andrew's church yard, was unmarked and that the episodes in connection with the commander's life were apparently forgotten by the Government and by the citizens of Staten Island. The following paper in this connection was presented for publication in the hope that it might lead to some movement for the recognition of the dead hero :

COMMANDER TIMOTHY GREEN BENHAM

There stands near the village of Richmond a massive stone mansion, whose first occupant was known to comparatively few of the members of the Association. It was the home of a neglected hero, Commander Timothy Green Benham—one of the noblest officers that has ever graced the naval service of our country. He was the father of Rear Admiral Benham, U. S. N., now serving in California.

The old mansion is almost hidden behind a thicket of choice trees and shrubbery, while great clusters of ivy creep up the rugged stone walls and conceal some of the windows. It was erected some years prior to the Mexican war, while its owner was a Lieutenant in the U. S. Navy. It was built of stone gathered from the farm, and its massive walls seem to have been erected to battle with the storms of centuries. The air of comfort that rests in the grand old hallway, occupying within itself almost the space of an ordinary modern dwelling; the large, old-fashioned, square rooms on either side of the hall, picture to one's mind the festive scenes that have transpired there in days of yore, when the genial old commander, retired from active service and resting upon his well earned honors, was made happier by

gathering around him his friends from all parts of the globe. Every nook and corner of the mansion is filled with relics made interesting by association, and prized by the family beyond the value of gold. Swords, paintings, shells, spears, knick-knacks, and curiosities of every conceivable shape and meaning are there, each one bearing its own little history, but all centering upon the hand that gathered them for his ideal home. Over the main hall is the dome, through which pours forth a flood of light into the corridor on the second floor, as well as the hall on the first. But few changes have occurred in the arrangement of the old mansion—only those, in fact, which naturally come with the lapse of years.

Timothy Green Benham was born near New Haven, Conn., in 1796, and entered the U. S. Naval Academy at the age of twelve years. He graduated in 1810, and entered the service as a midshipman. Among the papers which he left behind is the following :

PHILADELPHIA, Sept., 1810.

SIR : I wrote you a short time ago enclosing my sick ticket and reporting myself for duty, to which letter I have not received an answer. I now, Sir, with due respect, request orders to some vessel, if it meet your approbation.

I am, Sir, your most obedient servant,

TIMOTHY G. BENHAM.

Midshipman, U. S. Navy.

HON. BENJ. W. CROWNENSHIELD.

Secretary of the Navy.

Washington, D. C.

His first commission, however, was not issued until November 30th, 1814. His voyages were numerous and important, and many of them were exceedingly dangerous. He was with Commodore Porter's squadron for the suppression of piracy in the West Indies, and in one of the battles he received a bullet in his leg, which he carried ever afterward. He also

came near being the victim of a pirate's knife which, in a hand-to-hand struggle, he succeeded in capturing.

When a young man, and while holding the commission of a lieutenant, he was stationed at the Brooklyn Navy Yard. He frequently visited Staten Island and became acquainted with Miss Julia Lockman, daughter of Samuel Lockman, who belonged to one of the oldest families on the island. To this young lady Lieutenant Benham was married. The earliest mention of the name of Lockman in the county records occurs in 1680, when Abraham Lockman is said to have owned a parcel of woodland on the Fresh Kill. The old record says: "Edward Andros, Kt. Lieutenant, and Governor General, under his Royal Highness James Duke of York and Albany, etc., of New York and dependencies of America, granted to Abraham Lackman (as the name was then spelt), eighty acres of land on the north-west side of Staten Island, at an annual rent of one bushel of wheat." So, it will be seen, that in selecting a home for his family, Lieutenant Benham succeeded in procuring land which had belonged to the ancestors of his wife from the very day it had been purchased from the Indians. The house first occupied was the old Lockman mansion, which stood where the grove now stands, and which was demolished at the completion of the Benham mansion.

When the Mexican war broke out, the qualities of Lieutenant Benham were not unknown to his superiors, and he was selected to superintend the landing of American troops on Mexican soil. The work was accomplished under the most dangerous and trying circumstances. He was always successful, however; and on several occasions he was complimented by superior officers and his services acknowledged by the Government. During the same war he was given the command of the U. S. war schooner "Bonita," where he gained the credit of the navy department for his gallant conduct at the bombardment of Vera Cruz and the Castle, Alvarado, Tampico and various other battles.

Shortly after the close of the Mexican war, Lieutenant Benham paid a visit to his home. A reception was given him which is still pronounced to have been one of the greatest social events in the history of Staten Island. In the forenoon of the day in question the little village of Richmond was the scene of a large concourse of people from all over the country. Distinguished naval and army officers, statesmen and citizens were present. The court room of the "New Court House," as it was then called, was densely packed, and hundreds were unable to gain an entrance into the building. The occasion was the presentation to Lieutenant Ben-

ham of two massive silver pitchers and goblets, as a testimonial of the worth and esteem in which his neighbors held him. The family still retain these pretty relics with much pride and satisfaction. From them I was permitted to copy the following inscription:

"Presented to Lt. Commander Timothy Green Benham, U. S. N., by his fellow citizens of Richmond County, in token of their esteem for the distinguished services and nautical skill on board the war schooner "Bonita," during and subsequent to the attack on Vera Cruz, on March 24th and 25th, 1847, and of the admiration of his deportment in private life.

John S. Westervelt, John C. Thompson,
Nathan T. Barrett, Minthorne Tompkins
James M. Cross, Chas. E. Leveredge,
Lawrence Cortelyou, Bornt P. Winant,
Henry Cole, Richard D. Smyth,
John T. Harrison, Committee."

The presentation speech was made by Minthorne Tompkins, (son of ex Governor Daniel D. Tompkins), the manuscript of which is among the relics of the Benham mansion. The speaker said:

"Your fellow citizens of Richmond County have assigned to me, sir, the pleasing duty of communicating to you as well their approbation of the services rendered by you while attached to the Gulf Squadron, as also of the high estimation in which they hold your merit as a citizen and neighbor. They have also, sir, directed me to present to you in their name testimonials of their gratitude for such distinguished and meritorious services, and of their appreciation of your private worth and character. And permit me to say that on no occasion have my own feelings been more in unison with a duty assigned me than on the present.

"Yours, sir, was not the mere merit of having performed a duty when called upon by the Department which presides over that arm of the public defence to which you are attached. Although you had performed all the sea service which could be assigned to entitle you to promotion, yet, sir, when it became known to you that the war with Mexico would render necessary an attack on the formidable Castle of San Juan de Ulloa, and that other naval operations would probably precede or immediately follow such attack, you did not remain content, quietly awaiting orders from headquarters; but, prompted by a generous, noble and daring spirit, you immediately solicited the Department to place you on active duty. And, although it was within your knowledge that the vessels which were assigned to those of equal rank with yourself were of the smallest class, yet no sooner was it intimated to you that you might take command of the little 'Bonita'

—that little craft which had been rejected by your juniors in rank, but which you have immortalized by your gallant and interpid conduct—than with a promptitude rarely equalled you were ready for sea, and actually sailed from this port in an incredibly short time after having received notice of your appointment.

"In advertent to the dangerous but glorious career, through which it was your good fortune to conduct in safety the little 'Bonita,' we hesitate: we know not which most to admire, whether your noble daring and gallantry, or your thorough nautical skill and seamanship.

"When, sir, we contemplate you within musket range of the enemy's batteries, in the attack on Alvarado; when again, sir, in the attack on the Castle of San Juan de Ulloa, we contemplate you exposed to the fearful discharge of the artillery of a strongly fortified enemy. And here, sir, I can not better or in briefer language describe the active part performed by you during the late naval operations in the Gulf of Mexico than by quoting the language of a brother officer: 'Lieutenant Benham,' he says, 'took part in all the active operations of the navy, and the 'Bonita' was amongst the first vessels to obtain a position and open a fire on the forts at Alvarado, and so near did he approach them, when recalled by Commodore Conner, the musket balls of the enemy were passing over his vessel. Lieutenant Benham was again at the capture of Tampico, Trespan and Tobasco, and in that memorable attack on the Castle and Town of Vera Cruz by the Mosquito Fleet, under the gallant Tattale, where the little 'Bonita' was the admiration of the squadron. * * * *

"Accept, sir, on behalf of your fellow citizens these testimonials as a tribute of their gratitude, esteem and respect, and may promotion in rank, an evidence of the appreciation by Government, of your services speedily follow."

After the presentation ceremonies, hundreds of the assemblage repaired to the Benham mansion, where a royal banquet was held. Old citizens of the Island today speak of it in glowing terms.

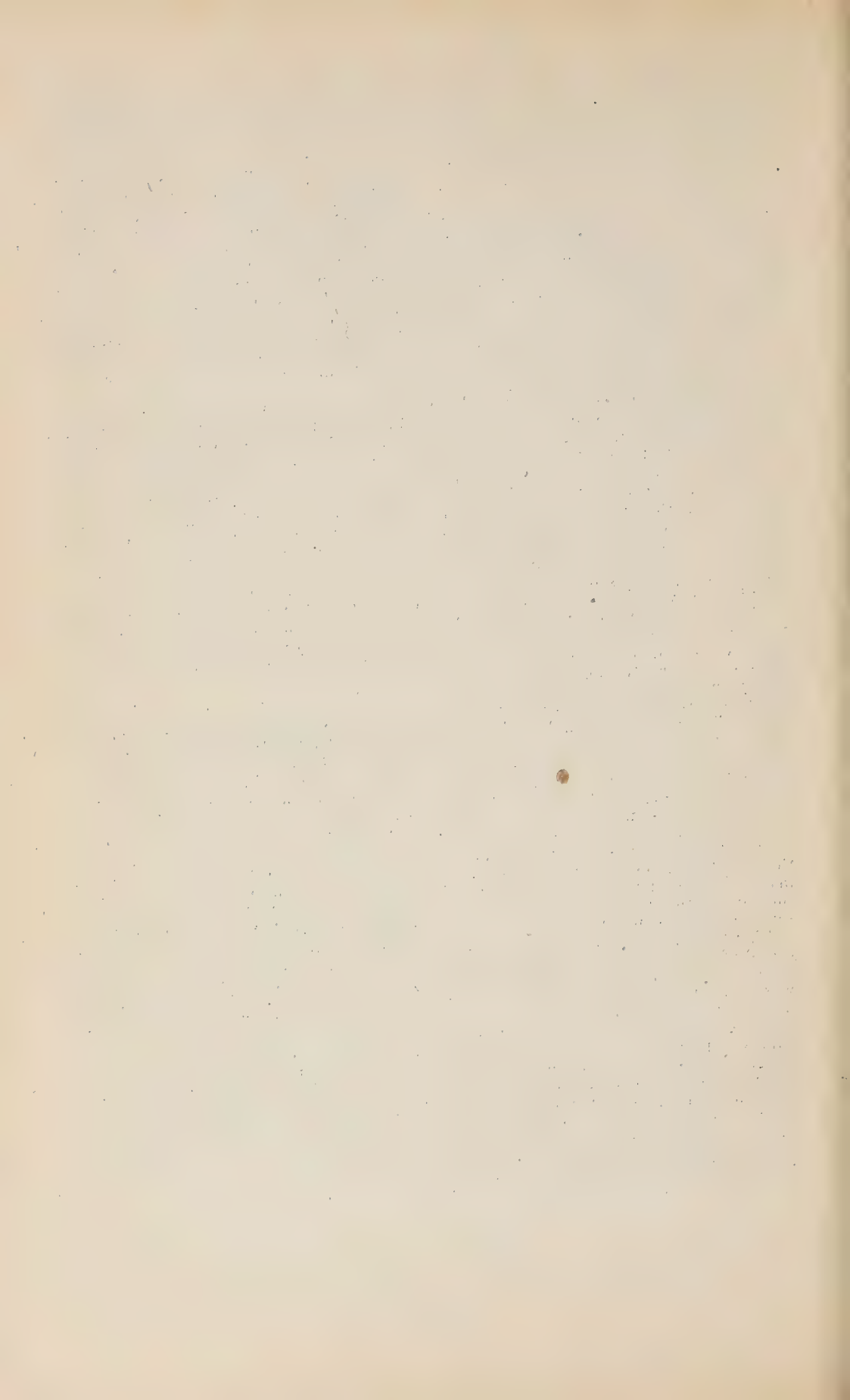
In the course of time Lieutenant Benham was promoted to the rank of Commander, and continued, under every circumstance, to serve his country well. From long and arduous duties and exposure his health became impaired, and he rested for a time in his splendid mansion at Richmond; but after a lapse of time his health was restored, and he was

again ordered to duty as commander of the Navy Rendezvous, in New York City. In 1855, the active officers composing the memorable "Board of Fifteen," retired him from the service which for a period of forty-one years had been his pride and devotion. From this time forth his health gradually failed, and his strong constitution at last surrendered to mortified pride and deferred hope. The link that bound him to a large and devoted family was severed, and the last solace was denied him and them, of merit acknowledged by the bestowal of his justly entitled rank and position, earned by a life of dangers, hardships and privations, which none but the faithful officer and sailor can appreciate.

He died on June 17th, 1860, and was buried beside old St. Andrew's Church in Richmond. This grave is unmarked, as his family has long contemplated removing all that is mortal of the old hero to the historic Moravian cemetery at New Dorp. Men far less entitled to such honors are resting beneath marble shafts, which a grateful country has erected to their memory. This grave has been too long neglected, and it is the sacred duty of the Government to erect over the last resting place of Commander Benham something that will establish the fact that his country still honors his name and loves his memory.

Mr. Arthur Hollick stated that a nest of the Barred Owl (*Syrnium nebulosum*) was found on Staten Island, March 27th, by Mr. Chas. Rufus Harte, a student of Columbia College. This is an addition to the list of birds known to breed here, and the following memorandum from Mr. Harte was read:

In the woods which are the continuation of the swmp (near Bull's Head) I came upon a sweet gum, having an "owlish" looking cavity. As I turned aside to investigate, a Barred Owl flew out and away into the depths of the woods, appearing again once or twice, but always at a very respectable distance. The tree was about two feet in diameter, with no limbs below the opening, which was some thirty feet up, and very irregular in form. The cavity into which it opened was about eight inches in diameter, and was filled to within six inches of the mouth with dead leaves and feathers. On this bed lay the three eggs, which were nearly hatched and very dirty. I did not see any remains of birds or mammals either in or about the nest.



PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

May 9th, 1891.

Meeting called to order at 8 15 o'clock.

In the absence of the president Mr. A. H. Burdick was elected chairman *pro tem*.

The resignation of Mr. William H. Mersereau was read and accepted.

The corresponding secretary announced that a second index to the proceedings was in course of preparation, to cover the three years ending next November.

A communication was read from Mitchell's Book Co., 830 Broadway, N. Y., stating that they had the original deed of sale of Staten Island by the Indians, in 1670, and inquiring if the Association desired to purchase or copy it. The corresponding secretary stated that he had requested Mr. E. C. Delavan, Jr., to examine the document, with the following result:

56 Wall Street,
New York, V. 9, '91.

ARTHUR HOLLICK, Esq.,
New Brighton, N. Y.:

DEAR SIR:

I have examined the conveyance in possession of the Mitchell Company, 830 Broadway, referred to in their letter to you. While the document presents many internal evidences of authenticity, two points strike the professional reader as odd. In the recital of parties the names of the grantees are first written, followed by the names of the grantors. The grantees are Governor Lovelace and James Duke of York, the former representing the latter. The grantors are various sachems.

The second point that seems to me unusual is that no totems have been drawn by any of the sachem grantors, and in their place are the ordinary marks that would likely be adopted by any illiterate.

Granting the authenticity of the document, what is its value? The price placed on it by the company is \$600. Its highest interest attaches when it is viewed from a purely antiquarian standpoint. Histori-

cally its interest is secondary. The first grant of Staten Island to Michael Pauw (1629-1630) was conditional on his acquiring the Indian titles, which we must assume that he accomplished. Pauw subsequently reconveyed to the West India Company (See Gay's History.) After the English ousted the Dutch authorities a conveyance by the Indians of Staten Island, to Governor Lovelace, before 1760, is said to have been made, followed by a deed of confirmation in 1760. (See Clute.) The latter is probably the same instrument now under consideration.

From the lawyer's standpoint Indian deeds are now of little or no practical importance. It has been held that the Indians had no title which would be recognized in the courts of this country. The only legally recognized title was that of discovery and conquest. (Trustees of the Freeholders and Commonalty of the Town of Southampton, respondents, *vs.* The Mecox Bay Oyster Company, 116 N. Y. Johnson *vs.* McIntosh & Wheat (U. S.) 543. Martin *vs.* Waddell, 16 Peters 367.)

Very truly yours,

EDWARD C. DELAVAN, Jr.

Mr. Arthur Hollick read by title a list of 35 fungi collected at Tottenville, October 4th, 1890, and determined by Chas. H. Peck, State Botanist. This will be published as a "special" at some future date.

Mr. Hollick presented a specimen of *Spirophyton Cauda-galli*, found on the shore at Tottenville—an addition to the local list of palaeozoic fossils found in the Drift.

Mr. L. P. Gratacap showed specimens of *Lymnea palustris* and read the following memorandum: The *Lymnea pulustris*, which was found last autumn by Mr. Davis, in the brook that courses along Washington avenue, and which was iden-

tified by Mr. Sanderson Smith, has been kept in confinement by me during the winter. The tank in which the individuals were placed was kept in a very cold room and partook of the changes in the winter weather. Two only survived the experience, and these have not hibernated but maintained a sluggish life all winter. This spring seven gelatinous capsules exuded, each containing about twenty five embryos. Amongst the authorities the opinion seems entertained that adults do not generally live over the winter and that maturity is reached in one year. This opinion seems very questionable. The species may repay some attention. On this continent it ranges as far north as Great Bear Lake in Canada, and in the United States extends from New England through Pennsylvania and Kansas to California and Oregon. Abroad it ranges from Siberia to Algeria and Sicily. About five varieties are recorded by writers. The black patches of *Lymnea* upon the cement blocks just under the overflow from the new pond recently made in the Snug Harbor clearings, south of Castleton avenue, may also prove to be this species.

Mr. W. T. Davis noted the Carolina Wren as an addition to the list of birds known to breed on the island and read the following note :

On the 26 of last April. I discovered a family of Carolina wrens (*Thryothorus Ludovicianus*) on Richmond Hill near the old British fort. One of the parent birds was perched on top of a small *Ailanthus* tree calling vociferously, while the other accompanied the young, which were hidden in a thick growth of low briers, grass etc, in and out of which they crept. They were just able to fly, indeed one of them could only do so for a yard or two, and much preferred climbing about the

briers. Later in the day the little birds had congregated under a small cedar, whose lower branches touched the ground, but they quickly sought the protection of the briers again when approached. It is hoped that they will not be molested, but continue to abide on Staten Island, for the Carolina wren remains all the year round where once it has fixed its home.

Mr. Davis also contributed the following botanical notes :

A swamp of three or four acres lies just north of the Amboy road, between Gifford's and the road to Richmond. At present it supports a thick growth of huckleberry bushes, poison sumachs, young red maples, a number of magnolias, etc. Several bushes of the Mountain Holly, (*Nemopanthes Canadensis*) also grow there, which species has not before been reported from the Island. In July, 1889, the deep red berries were conspicuous; in 1890 the bushes bore no fruit, but on the 26th of April this year they were found in blossom (Specimens were here shown.)

The peat is particularly thick and quaking in this swamp, and fifteen or twenty years ago, before it had been drained so extensively, the pitcher plant (*Sarracenia purpurea*) grew in its north-west corner, as I was informed by a man who lived in the vicinity. The common cranberry also grew there, and the man who told me about the pitcher plant, said his mother used to pick them for family use, but in his time he had never gathered over a handful. Now they appear to be exterminated. There is, however, an unreported patch of cranberries (*Vaccinium macrocarpon*), or perhaps more properly several patches, in the low open woods between Washington avenue and the road from Annadale.

Adjournment at 9 45 o'clock.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

June 13th, 1891.

Informal meeting.

Mr. Arthur Hollick called attention to the recent death of Mr. George J. Hicks, formerly an active member and for a year recording secretary of the Association. Mr. Hicks was graduated from the Columbia College School of Mines in the class of 1890, with the degree of "Metallurgical Engineer." He left Staten Island last Autumn, locating in Pittsburg, Pa., where his intention was to practice in the line of his profession. About two months ago he was taken suddenly ill with consumption and returned to his home on Staten Island where he died, May 15th, at the early age of 22 years.

Mr. L. P. Gratacap presented the following paper: Some months ago a young collector in New York brought me a specimen of trap rock, in which long flat blades of a greenish black mineral, with faint transverse striæ and a faint central groove, were very conspicuous. On visiting the locality the rock was found abundantly, distributed in strips and patches through the trap on the western edge of the Palisade dyke, overlooking the Hackensack marshes and north of Guttenburg village, New Jersey. At first sight this bladed mineral resembled closely marked specimens of Hypersthene, from Chateau Richer, France, and if the identification of the latter is correct, it is certainly the same mineral, and if so then the New Jersey trap displays a gradation into, and local developments of, Hypersthene or Hyperite, which I think has not previously been mentioned. But these blades may prove to be only hornblende, if Mr. Nason's diagnosis is correct, who alludes (Ann. Rep. State Geol. N. J., 1888, p. 37) to the trap at Lambertville, N. J., which, when broken, "shows long-bladed crystals of hornblende, two or even three, inches in length." The microscope should be called in to settle this and at this juncture, unfortunately, its help cannot be invoked.

The reference, this has to our island is as follows. In tracing the trap ridge of Staten Island recently, with Mr. William T. Davis, after passing the slight outcrop of the dolerite, in Lambert's lane, we crossed over to the fields south of the road and found a fair exposure of this same coarsely crystalline trap, exactly imitating the texture of the Guttenburg specimens, a texture strikingly contrasted with the dense, ringed and close fabric shown in the Elm Park and Graniteville quarries. The superficial aspect also of the specimens are noticeably different; those from Lambert's lane being dark schistose and soft and those from the quarries harsh, crystalline, brittle and light colored or gray, from the greater admixture of whitish feldspars. I shall probably refer to this again.

Mr. Sanderson Smith presented the following memorandum. The Indian deed of April 13 and 15, 1670, to which reference was made in our last proceedings, was printed in full in "Valentine's Corporation Manual," about 1856. It exactly agrees with Mr. Delavan's description as to the names of the grantees coming before those of the grantors. The marks are represented by various letters, which are not always the same for the two signatures of each sachem as they probably would be if they represented *totems*.

A fact which Mr. Delavan does not specially mention is that some of the young Indians (one only five years old,) who may be supposed to have had some rights in the lands, not having been present on the 13th, when the document was signed, it was signed by these on the 15th as well as a *second time* by several of the older chiefs. In the first deed, the names of the first four sachems are stated to have seals after them.

The deed is headed in the Manual, "Patents IV, 62, Secretary's Office," so that it is probably on record in Albany.

Mr. Jos. C. Thompson presented a block of Oriskany sandstone, found as a drift rock at Clifton, in which Mr. Gratacap had identified *Spirifera erecta*, *Rensselaeria ovoides* and *Leptana nucleolata*, Whit., the latter not previously noted from Staten Island.

The next regular meeting of the Association will be held in September.

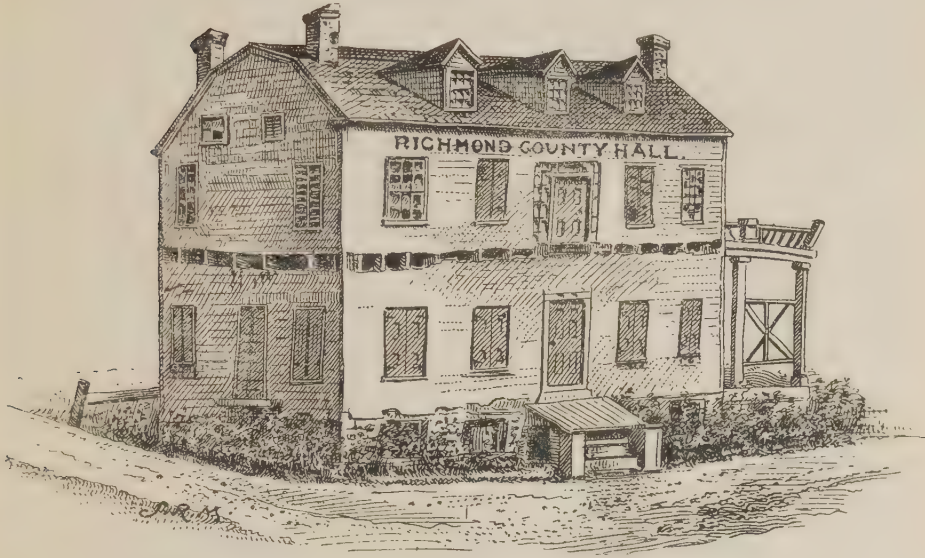
Sept 12, 1891

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION OF STATEN ISLAND.

September 12th, 1891.



Informal meeting.

Mr. Ira K. Morris read the following paper on Old Richmond County Hall :

The announcement that old Richmond County Hall, at Richmond, was to be demolished, calls attention to a venerable building which, although it has long been neglected and allowed to pass into decay, was for many years the most familiar structure in and the very centre of attraction of all Staten Island. It has stood for some time the simple symbol of desolation, of neglect, and of human forgetfulness. One by one, in later years, its weather-beaten shingles have rotted and fallen, and the bricks that long rested in chimney and wall have crumbled and rolled to the ground. Piece by piece its piazzas and shutters and doors have succumbed to the wild winter storms, and have been carried away in the darkness of night by the pilfering hands of poor people living under the shadow of Richmond Hill.

Richmond County Hall was erected about the year 1822, by a stock company consisting of Messrs. Lawrence Cortelyou, Richard C. Littell, Daniel Clawson, Herman Cropsey, Samuel Frost, and a few other prominent residents of the Island. At that time a real good hotel

in "Richmond towne" was deemed an absolute necessity. Richmond was the business centre of the Island; it was, in fact, the very hub of our little empire, which, in those days, was very much isolated. There were three other hotels (or taverns, as they were called at that time), in the village—the old Cuckles-town Inn, which stood on the corner lot directly in the rear of the present County Clerk's office; the King's Tavern, which stood on the corner lot opposite the recent site of the Dutch Reformed Church, and the lower part of the Washington Hotel, which was managed by the late Mr. Patrick Curry for the past forty-three years.

Richmond County Hall soon gained an excellent reputation, and made fortunes for several of its proprietors; but, it is remarkable to state, for some cause unknown to the writer, each and every one lost his money and became poor. Indeed, the most successful of all became so reduced that he died in the County Alms House, and although his remains were laid to rest in St. Andrew's cemetery, close by the old house that was once the scene of his prosperity, there were but three persons present to perform the last sad ceremony of death, scarcely

enough to lay him away for his long, last sleep in the grave.

The house soon after its establishment became the political headquarters of the county, and in the hall on the second floor Democrats and Whigs for many years held their conventions and caucuses, and indeed did much that aided to form the checkered history of Richmond County. Some of our older citizens still recall "campaign incidents" that will certainly compare favorably with events of recent date.

Early in the fifties, when the Whigs were thoroughly demolished and it looked for a time as if the Democrats would have everything pretty much their own way, (a rare occurrence indeed, for for many years the party that secured a majority of twenty-five in this county counted it as a great victory). But, just before the time for holding the convention there was a split in the Democratic party over the question of the extension of slavery. The leaders were John C. Thompson, of Thompkinsville, for one, and Colonel Nathan Barrett, of Factoryville (West New Brighton) for the other. The faction known as "Soft Shells" favored it, and the other, known as "Hard Shells," opposed it. As is well known, factions always fight more bitterly than parties. This was a genuine family quarrel. Both factions called their conventions at Richmond County Hall on the same day. The "Soft Shells" had hired the hall from four o'clock to six, in the afternoon, and then they were to surrender the premises to the "Hard Shells." But the convention got into such a row over the adoption of its slavery extension resolutions that it was half-past seven before a message from the "outside world" could reach it, and this was effected by the angry "Hard Shells" bursting in the door. The late Dr. Jewison, of Westfield, presided over the "Soft Shell" convention, and when he saw the door coming down he proceeded to intermix physical force with parliamentary law.

Almost the first "Hard Shell" to enter the hall after the door tumbled in, was Uncle "Ike" Mersereau, of Westfield. Dr. Jewison set sail for him, and the two had a very lively time of it. But Uncle "Ike" evidently felt that he was not only fighting for a principle, but his rights also, and proved to be more than a match for the chairman of the interrupted "Soft Shells." The Doctor drew a revolver and was about to end Uncle "Ike's" physical and political career, when the latter closed in on his adversary and knocked him down. It was not generally known that Dr. Jewison wore

a wig; but he did, and it is safe to assume right here that that ornamental appendage may have saved his life. As he fell to the floor Uncle "Ike" was in the act of jumping on him, when he was suddenly startled by the sight of the Doctor's perfectly hairless head.

"My God! what have I done?" exclaimed Uncle "Ike." "I have knocked the whole top of his head off! What have I done? O, what have I done?"

By this time the "Hards" and "Softs" were so badly mixed up and were going for each other so ferociously that it was impossible to distinguish one from another. Several of the "Soft Shell" delegates were opposed to fighting; and jumped out of the windows to the piazza and thence to the ground, to escape being forced to pay a penalty for trifling so long with the foe. Some of them were set upon, however, on reaching ground, and had to fight for their lives. There are men in this county to-day who carry enmity in their hearts as the result of that "bloody conflict" of about forty years ago. It was hinted that not a few Whigs "took a hand" with the "Hard Shells" and helped them to gain rightful possession of their property, and at the same time enable them to place a second Democratic ticket in the field, thereby hoping to secure the election of their own candidates. When the fight had ended the "Hard Shells" rose, Phoenix like, and organized their convention. Captain John Bennett was chairman, and Dr. R. H. Golder secretary. It was but natural that the Whigs should have carried almost everything in the county that Fall. Their convention was held a few days "after the battle," in the same room, and William H. Vanderbilt was the chairman.

The "Hard Shells" nominated Joseph Egbert, of Garrettsons, for Congress. He was quite popular with the "Softs" and had many friends among the Whigs. He was elected and served the district one term.

There was another important political event in which this old house figured. It was probably the most unique incident in the political history of Richmond County. The campaign of 1841 was a very earnest struggle. James K. Polk was the Democratic candidate, and Henry Clay the standard-bearer of the Whigs. There was a "betting club," with its headquarters at old Nautilus Hall, at Tompkinsville, and everybody who wished to back up his argument by wagering his spare cash could be accommodated at that place. The Whigs were very noisy in the early part of the campaign, and were

going to elect Henry Clay with a hurrah! The Democrats were a little backward at first; but the bluster of their opponents had the effect of setting them in motion. The Democrats also nominated William L. Marcy for Governor and Henry C. Murphy for Congress. Both of these men were popular on Staten Island, and their nominations took like wildfire.

Governor Marcy was recognized as the "farmers' candidate," and a farmers' celebration and procession, arranged in accordance with "the eternal fitness of things," was at once organized. The procession contained scores of ox-teams, many of them "four-in-hand," and all sorts of farmers' equipages were seen along the line. The head of the procession started from Nautilus Hall, and the various vehicles fell into line as opportunity offered. It passed up Bay street to Vanderbilt avenue, Clifton, and thence in the direction of the "Dutch Farms," now called Concord. When the head of the column had reached the Clove road at Concord the rear was just leaving Nautilus Hall. Colonel Ray Tompkins was the Grand Marshal, and three of his aides were Captain Richard Christopher, Dr. Ephriam Clark and John H. Van Clief, two of whom are still residing on the North Shore. The procession reached Richmond about noon, and many who participated in it attended a grand reception in Richmond County Hall, given in honor of Captain Rynders, of the famous Empire Battery. Captain Rynders, at that time, was the acknowledged Democratic leader of New York City, and his battery was the "crack" marching club of the country. The battery numbered over one thousand. It had chartered a steamboat, and after passing through the Staten Island Sound entered the Fresh Kill Creek and steamed up to "Richmond town." It was the first steamboat that ever reached Richmond. A grand mass meeting was held during the afternoon, and addresses were delivered from "the new Court House" steps. Charley Newman is remembered as one of the speakers. The members of the battery dined in Richmond County Hall, after which they gave an exhibition drill in the streets and in a field near the Court House. When midnight came, and while the full moon was lending its splendor to the scene, the battery re-embarked, and amidst the cheers of thousands of men on shore, the steamboat slowly wended its way down the winding creek and faded from view.

A remarkable suicide occurred in Richmond County Hall, several years ago, by one of the most prominent and popular citizens of the Island. Obadiah Bowne though wealthy, respected and prosper-

ous, it is claimed was driven to the rash act through unfortunate domestic complications. His last residence was in the neat dwelling opposite the "Old Club House," near Court House station, and which has since been occupied by ex-Postmaster General Thomas L. James. Mr. Bowne was elected to Congress from this district, on the Democratic ticket, his rival being a well-known Whig leader named Coolley. The day before the suicide Mr. Bowne went up to the city, made a friendly call on the editor of one of the daily papers, and in the course of conversation incidentally remarked that an important event would transpire in Richmond that night, and he would very much like to have a representative of that paper present. The request was granted, and Ben. Williams' old mail coach from Quarantine landed Mr. Bowne and the reporter in Richmond in time for supper. The doomed man seemed to be exceptionally happy. After supper he called for cigars, and sat for some time smoking, chatting and joking with his friends, who had gathered in from about the little village. Mr. Bowne directed Landlord Hodge to prepare a room with two beds, and when it was in readiness the reporter was invited to go up. As they arose to go, one of the company addressed Mr. Bowne and invited him to attend some local event on the morrow. "O, I don't know about that," he replied; "possibly I'll be dead in the morning." And then, followed by the puzzled reporter, he went up to his room. The two chatted for a few moments, and Mr. Bowne lay down upon his bed, as if to rest a while before preparing to retire. Suddenly he placed his hand in his pocket and, taking out a phial, drank its contents. The reporter at once saw that his host had swallowed poison, and ran down stairs to give the alarm. Medical aid was immediately summoned; but before the physician arrived death had finished its work. The reporter soon disappeared, and some how or other, worked his way back to the city and told his sensational story in truly Metropolitan style. But the news of the suicide on Staten Island cast a shadow over every household. Obadiah Bowne had political opponents, but no enemies. Thousands who had shared his friendship lamented his untimely end, and the unnumbered poor who had received aid from his liberal hand heard the news only with heart-aches. Two days later a solemn throng of people assembled in Richmond village to take a farewell look at the dead but familiar face.

Old St. Andrew's Church and the shady cemetery, which had been familiar

to the dead Congressman all through his boyhood and manhood, would not now hold the friends of Auld Lang Syne. Even the street and the steep hillside were crowded with people. As they laid all that was mortal of him to rest, and the solemn words, "dust to dust," were slowly uttered, there were only blessings for the memory of the dead; and I am sure that a more appropriate epitaph could not be written than the words uttered by an aged citizen of the village to the writer a few days ago, "No better man ever lived on Staten Island than Obadiah Bowne."

"Training day" used to be a great event on Staten Island, and notwithstanding the "training" was done on New Dorp lane, and the military ball was held at the Patten House, Richmond County Hall was as surely expected to have its training ball and supper as the sun was to shine on that great day. Although these unique performances were directed by law, and there was a statutory fine of seventy-five cents for non-compliance, the fun which "the boys," old and young, used to have was the real incentive for doing "military duty." Very few had uniforms, and fewer had muskets. Still the patriotic memory of the native heroes of two bloody wars, the success that had crowned them, the bright flag of the Union, with its small but resplendent cluster of stars, the drums and fifes, still rehearsing the battle music of our forefathers—all these re-echoed in the hearts of our Island's "ragged regimentals," and re-awakened the proud spirit of '76. It is interesting indeed at this time to listen to the stories of some of the scenes that used to make up "training day." To many of us who have witnessed the perfect skill of modern military tactics, the tiresome manual of arms and the awkward performances of flank and similar important movements of those old days are ludicrous in the extreme. But it was when the day had ended that our Island soldiers used to meet in Richmond County Hall, and not only describe whatever their eyes had beheld while "training," but recount and comment upon what had passed into history since "the days that tried men's souls." Old men are still living among us who well remember how the sun used to creep up out of the bay, on the following morning, and beaming through the leafy woodlands of the east, summon these animated military critics to disperse and repair to their homes. Those wordy battles at the close of "training day" did no harm, for they not only served to educate the people, but to keep alive and

strengthen their patriotism which was to be tested in the great crisis of years to come.

For many years there was an association in the little village of Richmond, facetiously called "The Owls." They met in Richmond County Hall. Their chief pleasure—or, perhaps it would be more proper to say their chief business—was to play poker or some other fashionable game of cards. The leading spirit of "The Owls" was William H. Vanderbilt. Night after night, all night, week after week, for years, "The Owls" used to sit around the green-covered table and assault each other's pocket-books and attempt to defend their own. Unless the landlord received a percentage of the money won, it is quite certain that he made very little by sheltering this unique club. It is stated on good authority that they seldom spent more than three dollars a night. They drank very little, and the reason given for it was the fear of being cheated in the game. The names of several of "The Owls" were given me, but it is not worth the while to recall them here.

For a century or more—a period which terminated shortly after the establishment of a railroad on Staten Island—sleighting parties all hailed for Richmond, and they dined and wined and danced in Richmond County Hall. Everybody expected to have a good time if they went there, and seldom indeed were they disappointed. Stables and hotel yards were filled and the streets of the village were lined on either side with blanketed horses. "Eat and dance and go home with the girls in the morning," was the motto of many a young Islander, who, in "the golden long ago," has passed away.

About thirty years ago there existed a faction war between many of the young men of Northfield and Westfield, and as surely as they met there was trouble. Richmond seemed to be the favorite battleground. If one faction was enjoying the hospitality of Richmond County Hall the other would besiege the place, and this called for a regular Donnybrook scene in the open street. Frequently with fist and club and missile they would struggle to mutilate each other and keep up the fight until one or the other retreated or otherwise acknowledged defeat. "All liquors in those days were sold at three cents a glass," said an old citizen to the writer, and that may have accounted for a great deal of the trouble.

Richmond County Hall has indeed had a strange career. Among its proprietors I recall Joseph Christopher, whose portrait now hangs on the walls of the Old

Billopp House; Max Maretzek, the famous opera manager; Kipp, the celebrated tally-ho proprietor; David Ryers, O. P. Hodge and a number of others. Mr. Hodge was "in at the finish." Its doors were closed to the public about twelve years ago, and after being vacated by Mr. Hodge became a free tenement for colored people. The building has been demolished during the past few days, and the premises have been presented to that very worthy organization, the King's Daughters.

The name of Old Richmond County Hall will ever be familiar to the readers of our Island's history, and the good and the bad it has done must be left to rest with the past. Time may, perhaps, deal kindly with its memory, and thus keep alive only that which will be pleasant and profitable to live on in the annals of a great Island and a progressive people. Yet the past and the future of these premises seem so far apart in their respective attitudes towards humanity and its wants, that my rude pen cannot resist drawing the line. Certainly no one will claim for the old building that much has been done within its walls for the elevation of mankind. So it has passed away to make room for another structure, which will give shelter and comfort to

those whose ambition it is to serve the Master, and to aid in making the world better "In His Name."

Mr. William T. Davis presented specimens of *Liatris spicata*, recently collected at Mariners' Harbor. This plant was reported from Staten Island years ago, and admitted into the flora of the county, but until now no authentic specimens have been seen. Mr. Davis also presented specimens of *Tilia Americana* from a new locality, with the following note:

Two additional localities for the American linden (*Tilia Americana*) were discovered this Summer. While in company with Mr. Gratacap on the 3d of July several trees were found to the south-east of where Willow brook flows into the salt meadows. Many lindens also grow along the course of the New Springville brook, about a mile distant from the last mentioned locality. The five stations where these trees have so far been found, are all on the westerly side of the serpentine range of hill—the back-bone of the Island—and occur in a district of about four square miles.

Mr. Arthur Hollick reported *Medicago sativa* from the bluff at Prince's Bay. The only other station for this plant thus far noted was in ballast at Port Richmond on the opposite side of the Island,

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

October 10th, 1891.

Informal meeting.

The following paper, by Mr. Chas. W. Leng, was read:

NOTES ON THE TRIBE HISPINI.

The habits of certain species of Chrysomelidae, members of the tribe Hispini, were first made known by Dr. Harris in the year 1835, in the Boston Journal of Natural History (vol. i. pp. 141-147) and were restated in his "Insects Injurious to Vegetation" (p. 120). These species are:

Microrhopala vittata, Fab., living on Golden Rod. *Odontota rubra*, Web., living on Apple, etc. *Odontota dorsalis* Thunb. living on Locust. They all occur in this neighborhood as do several other species belonging to the tribe, but according to Mr. Wm. Beutenmüller's "Catalogue of Transformations" (Journ. N. Y. Micros. Soc. VII. pp. 1-52) no further record has been made of their habits.

I am now able to add some notes on our Staten Island species and especially on the lava of *Odontota scapularis*, Oliv.

Frequently in the woods, there grows freely a trailing vine of the Pulse family, identified for me by Mr. W. T. Davis as *Phaseolus helvolus* (or in the last edition of Gray's Manual *Strophostylus peduncularis*, Ell.) Its leaves are often marred by white blotches, the parts affected consisting only of the colorless epidermis of the leaf; its substance having been devoured by the larva of the *Odontota*. In early June the beetles are found upon these plants in copulation or perhaps the female in the act of ovipositing. The eggs are irregular, rough, black masses, about one millimetre in diameter and are attached to the under side of the leaf, usually singly. The larvae are oblong, flattened, somewhat cuneiform in outline, soft and of a whitish color, except the head which is piceous and corneous. They are, of course, minute when first hatched but continue to grow larger, always living within the leaf and enlarging the white blotch as they eat, until by September they have attained a length of one fourth inch. The pupal stage is probably of short duration. The beetle is black, roughly sculptured, and has the humeral

angles reddish. It is, from an ignorance of its habits perhaps, accounted rare by some collectors, but in the woods of Middletown and in Britton's woods, where its food plant grows freely, it is during June one of the abundant insects, and late into the summer still occurs.

Microrhopala vittata, living on Golden Rod, oviposits and perfects its transformation earlier than the *Odontota* and frequently three or four larvæ inhabit the same leaf. *Solidago Canadensis* is especially favored by this beetle and early in August the lower leaves will be found browned and entirely eaten, and in the pocket formed by the separation of their two surfaces after the larvæ have eaten away the interior are the freshly hatched beetles. From that date, the second brood lives on the plants and eats the leaves into sieve-like forms, and now in October, the tops also appear to be attacked. They are closely imbricated and the beetles are nestling in the narrow crevices.

Several other species of the tribe live on Staten Island, but I am yet ignorant of their food plants.

Mr. Arthur Hollick called attention to the gratifying manner in which the law relating to the protection of song birds was being enforced in the county. During the past two weeks at least three gunners had been arrested and heavily fined. On October 1st one Gustav Merle, of New York, was arrested and fined \$140 by Justice Augustus Acker. He was caught with twenty-three dead birds in his possession, which Mr. Hollick assisted in identifying as follows: 8 high-holders (*Colaptes auratus*), 2 yellow-bellied woodpeckers (*Sphyrapicus varius*), 9 hermit thrushes (*Turdus Pallasii*), 3 cat birds (*Mimus Carolinensis*), and 1 titmouse (*Parus atricapillus*).

Dr. N. L. Britton called attention to the fact that the next meeting would be the annual meeting, at which time the Association will have completed the first ten years of its organization, and expressed the hope that there would be a full attendance.

PROCEEDINGS

OF THE

NATURAL SCIENCE ASSOCIATION

OF

STATEN ISLAND.

VOLUME III.

Including the two years beginning November 14th, 1891,
and ending October 14th, 1893.

Edited by ARTHUR HOLLICK, Secretary,
AND OTHER MEMBERS OF THE ASSOCIATION.

The price of this volume is \$2.50 Single numbers 10 cents each.
Some of the single numbers of Vols. i and ii cannot now be furnished, but a limited
number of complete volumes may be obtained, at \$2 50 each,
from the Secretary, New Brighton,
Staten Island, N Y.

NEW BRIGHTON, NEW YORK.

1893.

PREFACE.

Volume I of these Proceedings, covering the first five years of publication, consists of sixty numbers and includes seventy-four pages. Volume II, covering the following three years, consists of thirty-three numbers and includes eighty-seven pages. The present volume, covering the remaining two years to date, consists of twenty-four numbers and includes sixty-seven pages.

The three volumes therefore vary considerably in the length of time respectively covered, but the constant increase of material presented for publication from year to year has rendered them approximately equal in size.

The decision to terminate this volume with the Proceedings of Oct. 14th, 1893, enables a new departure in printing the Proceedings, under volume, number and page, to be conveniently inaugurated with the first issue of a new year.

The pages of the present volume are supposed to be numbered as follows, in accordance with the dates of issue :

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PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION OF STATEN ISLAND.

November 14th, 1891.

Meeting called to order at 8.30 o'clock.
The president, Dr. N. L. Britton, in the chair. On account of the absence of the recording secretary, Mr. Arthur Hollick was elected secretary *pro tem*.

Messrs. John Kadletz and Anton G. Methfessel were elected active members.

This being the annual meeting reports of officers for the past year were read and accepted.

The treasurer reported an income, including balance from previous year, of \$146.75, expenses amounting to \$61.66, leaving a balance on hand of \$85.09.

The recording secretary reported one death and three resignations, leaving 39 members upon the roll of active membership.

The curator reported 214 additions to the library, including the following new exchanges: Imperial German Acad. Leopoldino-Caroline; Natural History Museum of Hamburg; and Rochester Acad. Sciences. The total number of exchanges is at date 26, distributed as follows: N. Y., 5; Washington, D. C., 2; Colo., 2; N. J., N. C., Conn., Calif., Pa., Kans., Ohio, Ills., Mass., and Manitoba, each 1; Canada, 2; Scotland, 1; Cent. Amer., 1; Germany, 3.

The corresponding secretary read a list of notices in regard to the work of the Association from scientific periodicals and gave a resumé of correspondence received and transmitted. Amongst the letters read were many congratulating the Association upon the completion of the first ten years of its organization. On motion the following were ordered printed as part of the proceedings:

WEST NEW BRIGHTON,
STATEN ISLAND, N. Y.,
November 2d. 1891.

ARTHUR HOLLICK,
Corresponding Secretary, Natural
Science Association:

MY DEAR MR. HOLLICK:

I congratulate you sincerely upon the happy completion of the first decade of the Natural Science Association. The constancy and enthusiasm which have characterized its work, in a community largely engrossed in very different pursuits from those of scientific study, are an inspiring incentive to every kind of diligence, so that the public service of the Association has not been confined to its especial department.

In that department you have told us much more than most Staten Islanders knew, and by awakening a local interest in the natural history of the island you have stimulated the public spirit, which is the crowning grace of every community. The monthly bulletins of your modest transactions are the witness of an activity which, like virtue, is its own reward, and like virtue also it is a general benefit. With all my heart I say to your Association, with the fascinating vagabond in the play, whose sympathies were better than his conduct, May you live long and prosper!

Very truly yours,
GEORGE WILLIAM CURTIS.

NEW YORK, Nov. 4th 1891.

MR. ARTHUR HOLLICK,
Cor. Secy. Natl. Science Assn.:
MY DEAR SIR:

I wish to congratulate your association not only on its success in maintaining its existence in our community, but on the valuable work it has done during the past ten years.

It is most delightful in this age and in our immediate locality, to find a body of men earnestly devoted to the study of something else beside money-making and, still further, not ever bent on self-advancement through invention or some other

mode of inducting self into the results of their work, but willing to sit at the feet of the Great Master and learn of Him.

I am not at all learned in the matters of which your papers, as published, generally treat, but I well know how elevating and refreshing are the contemplation and investigation of the subjects to which they refer and heartily wish that an interest in them was much wider spread.

In time I trust your society will have a convenient and attractive home and will thus extend the sphere of its usefulness and the circle of its members.

With my warmest wishes for your permanent success, I am

Yours very sincerely,
JAMES MCNAMEE.

FREEHOLD, N. J.,
Oct. 26th 1891.

ARTHUR HOLLICK, Esq.,
Corr. Sect. Nat. Sci. Assn.,
Staten Island, N. Y.:

The interesting fact has reached me that your Assn. has attained the first decade of its existence. May one who has frequently observed your proceedings congratulate the society, not only on its tenth birthday, but more on the character of its work, and its positive progress.

There appears to have been a general and well directed zeal by the members at large, with a good showing of loyal workers, conscientious contributors from the varied stores of local intelligence. In this way your Proceedings are becoming a store-house of local information on natural history, traditions, folk-lore, biography and home history. Hence it is to be hoped that copies of the Proceedings have been preserved, which bound, would be a valuable record of your first ten year's work. Please convey to the Association the assurance of my warm appreciation of its past, with glowing wishes for its future.

Respectfully yours,

Samuel Lockwood,
Pres. N. J. State Microscopical Society.

PHILADELPHIA, Oct. 25th, 1891.

ARTHUR HOLLICK,
Corr. Sec. Staten Island. Nat. Science
Association:

DEAR SIR:

I observe that at your next meeting, in November, you celebrate the tenth anniversary of your existence as a local scientific body. Permit me to congratulate you on your vigorous health and to wish for you many returns of future decades.

Your position, geographically speaking, is an exceptionally good one for research over a limited area, since Staten Island

includes within its borders both sides of the great geological boundary line between the Piedmont region and the coastal plain. The results that you have under observation are exceptional variety of conditions for life. Your high lands belong to the Alleghanian sub-region or district, and your low lands are the extreme north-eastern apex of the Carolinian. An especial interest attaches therefore to the distribution of plants and animals in the region under your immediate observation. The low lands of New Jersey, of which the extreme point reaches Staten Island, have always been a region of interest to the naturalist from the many peculiar species, or species of southern distribution, which are found there.

I may mention in this connection that on a recent exploration of some of the streams in Cape May Co., N. J., I obtained the usual species of fishes belonging to the Carolinian fauna, and also a new species of water frog of the genus *Rana*, totally unlike any species hitherto known in this or any other country. I saw nine individuals and of these I secured seven. I anticipate that it will be found in suitable situations within the area of the Carolinian fauna. You may find it on Staten Island, if you have suitable localities. These are stagnant water, ("slews" or "cut-offs"), in the woods. A description of it will appear in the *American Naturalist* for November, under the name of *Rana virgatipes*.

Your tract has an interest from the standpoint of animal migrations both on land and in the water. I suggest also that you have not yet investigated the aquatic life that surrounds you on all sides and will doubtless yield you valuable results.

With the best wishes,

I am yours,

E. D. COPE.

[As peculiarly *a propos*, of the above letter Mr. Jos. C. Thompson presented the following note:—In September last I discovered near my house, at Clifton, a small pea-green frog, perched on the top of a milkweed leaf, and Mr. W. T. Davis, who was with me at the time, has kindly identified it for me as *Hyla Andersonii*, a rare species and an addition to the fauna of the Island.]

OFFICE OF THE STATE ENTOMOLOGIST,
ALBANY, October 28th, 1891.

MR. ARTHUR HOLLICK,
Secty. Natural Science Association
of Staten Island:

DEAR SIR:

Now that your society is about to celebrate the completion of the first decade of its existence, it gives me much pleasure

to be able to congratulate you upon the auspicious event. Many organizations similar to yours have for a while had a life equally vigorous, but have died without reaching your age. I rejoice that no signs of lessened vitality or of approaching decay are to be seen in your association, but, on the contrary, everything that can give promise—may I not say assurance—of a long, healthful, strong and useful life.

Feeling, as I have long done, the special services that may be rendered by local organizations—the far more valuable contributions that may be made to natural science by thorough explorations of a limited locality, rather than attempting to glean from an extended territory—I have during the past years watched the operations of your society with much interest, and I may also add, with great gratification. Your published Proceedings have kindly been sent to me, and its entire and complete series of which I boast, is a valued addition to my library. I have found therein much of importance to me in my own special department, and it is evident that there is also in its pages much that will be prized by those engaged in other branches of science and by the antiquarian.

Please accept my heartfelt wishes for the continued prosperity, increased strength and enlarged usefulness of your association, through many ensuing decades; and may the bright and cheering retrospect that will surely gladden your hearts at this your decennial, be multiplied a hundred-fold, if that be possible, as a well-earned reward for those of your successors who may have the privilege of celebrating the association's centennial.

Very sincerely yours,
J. A. LINTNER.

STATE HALL, ALBANY,
October 29th 1891.

MR. ARTHUR HOLLICK,
Cor. Sec'y of the Nat. Sci. Association
of Staten Island:

DEAR SIR:

Your letter of Oct. 23d was duly received but pressure of labor has prevented an earlier reply, nor now am I able to give it that attention which the occasion demands and which it would give me pleasure to do.

I am sure it is well for Societies, and for individuals too, to pause from time to time in their onward progress and take a retrospective view of the past. By so doing they may better see what they have accomplished and form an estimate of what yet remains to be done. They may experience more fully the satisfactory enjoyment which worthy achievements af-

ford and be stimulated thereby to go forward in the path of duty to still greater achievements. If perchance failures have occurred they may profit by sad experience and avoid in the future the paths that led to them. I am confident that a ten years retrospect by the Nat. Sci. Association of Staten Island will afford its members abundant cause for congratulation and encouragement.

At first thought, it might seem that your field of labor is somewhat circumscribed, being limited to a single island of moderate extent, but you have probably learned long 'ere this that the field is ample and that its resources are not easily exhausted.

You have wisely, as I think, included in your researches all departments of Natural History. Geology, Conchology, Botany and Entomology all receive due attention, as they should, for a common band of union exists between all of them and each sheds additional lustre upon and throws new charms about the others. Being interested myself in Botany I have noted with peculiar and gratifying interest the work of your botanists. They have shown that one half the flowering plants of the State may be found on Staten Island. They have recorded the occurrence there of many rare and interesting species. They may well be proud of the discovery there of such trees as *Pinus mitis*, *P. inops*, *Quercus heterophylla* and *Q. Rudkini*.

When their investigations shall have been extended so as to include the lower Cryptogamia, and especially the fungi, they will find a wide and interesting field opening before them, and one which will not soon be exhausted. Please convey to your Association my congratulations upon the great measure of success that has attended their labors during the first decade of their organization and my sincere wishes for their still greater prosperity in the future.

Very truly yours,
CHAS. H. PECK.

The corresponding secretary remarked that the Association had earnestly endeavored to remove the well merited stigma from Staten Island, that it was merely a dormitory and pleasure ground for a community whose interests were largely centred in New York City and that the letters just read would seem to indicate that their efforts were beginning to be appreciated by a very wide circle of friends.

The president then addressed the meeting as follows:

The history and past work of the Asso-

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION OF STATEN ISLAND.

December 12th, 1891.

Informal meeting.

Mr. L. P. Gratacap, showed a thin section of the coarse trap rock from Lambert's Lane, mentioned in the proceedings of June 13, 1891, and read the following further memorandum in connection with it:

This coarse trap, previously alluded to as possibly containing hypersthene has been since examined microscopically and found to be a true diorite, made up of hornblende, plagioclase feldspar and quartz, with traces of serpentinization, due to alteration. It does not contain hypersthene. In hand specimens it is markedly different from the usual fine grained, compact trap from the Graniteville quarries and would not form as good a stone for road making and other economic uses as does the latter.

Mr. Gratacap also presented the following views in regard to the trap dike and its possible influence on the water supply of the region:

The trap dike on our Island, which expands into a widened area at the Elm Park quarry, passes from that point south-westerly in a narrowed ridge, scarcely observable beneath the mantle of drift which covers it until at Graniteville it again is distended into a dome-like nucleus, which extends to the eastward to the Church road, at Krumm's tavern, where the trap rock is only some seven feet or less below the surface. From this point it sinks and is found again on the surface south of Lambert's lane, where the road ascends its somewhat steeply sloping sides. Now the question seems an interesting one whether

the springs on the north-west side of the trap ridge may not be regarded as flowing from heads of water in New Jersey, as the trap dike would seem to preclude the derivation of their supply from the water shed of the hilly parts of the Island. The low flat lands enclosed in the curved arm of the trap, which, as is well known, stretches out into Long Neck, is mainly a sandy region and I think does not possess the arrangement of impervious drift clay and water-bearing gravels noticeable in our water bearing district. Just a few rods from Graniteville, on the Old Place road, there rises a spring which seems to come up on the eastern wall of the trap, and at Lambert's lane, where the coarse trap rock crops out on the surface, a spring comes up on the west side of the trap. Do these two springs acquire the hydrostatic pressure which makes them springs from different quarters, and in each case is the wall of trap the cause of their rising where they do? Furthermore the ridge south of Long Neck, and separated from the latter by a shallow hollow, up which an arm of the Fresh Kills extends, so exactly imitates the low, rounded and long dome-like back of Long Neck itself and to suggest that there is a bifurcation of the trap ridge, or a parallel vent at this point, and if so the wells of the Crystal Water Works, at the end of this ridge, are also separated from the water shed of the Island by a trap wall and may represent a water source situated in New Jersey. Springs are found on either side of this suppositional second (?) trap flow and it may form a deep-seated barrier between two

different areas of water drainage, the area north and west of it belonging to New Jersey, the area south or east of it probably insular.

Mr. Arthur Hollick called attention to the fact that in a paper entitled "A Few Words About Our Water Supply," published in the Staten Island Magazine for August 1888, the relation of the trap dike to the water supply was commented upon in the following words: "I can well remember the mystery which was supposed to be inseparable from the source of the springs [east of the trap ridge] * * * * some persons even went as far as the Orange Mountains in New Jersey to account for them, utterly ignoring the fact that the immense trap dike, which begins at the Palisades, forms Bergen Neck, crosses the Kills and extends through our Island from Port Richmond to Linoleumville, entirely cuts them off from this source."

Mr. Hollick remarked that it was a matter of considerable interest to find that two observers had arrived independ-

ently at practically the same conclusions in regarding the trap dike as a barrier between different water sheds.

Pieces of a drift bowlder of Lower Helderberg limestone, found at Arrochar, was shown by Mr. Gratacap, in which the following fossils were identified: *Meristina arcuata* Hall; *Spirifera macropleura*, Conrad; *Strophodonta Becki*, Hall; *Strophomena rhomboidalis*, Wahl; *Orthis subearinata*, Hall; *Eatonia medialis*, Vanuxem; *Ceolaspira concava*, Hall; *C. imbricata*, Hall; and *Gosselettia mytilimera*, Conrad. The last five not previously reported from the Island. Also portions of a similar bowlder from the shore at Totenville, containing *Tentaculites gyracanthus* Eaton, and *Fistulipora?* sp.?, both new to the Island.

A note from Mr. Ira K. Morris was read, in which he stated that the sketch of old Richmond County Hall, from which was prepared the cut printed in the proceedings of September 12th, 1891, was made in September 1890. The building has since been entirely torn down.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

2
January 9th, 1894.

Informal meeting,

The following paper, illustrated by maps and specimens, was read by Mr. Arthur Hollick:

On the 4th of April, 1881, Dr. N. L. Britton read a paper before the New York Academy of Sciences on the geology of Richmond County. This paper was published in the Annals of the Academy, Vol. II., No. 6, and in it the prediction was made that Cretaceous clays would be found beneath the Drift to the south and east of the Archæan ridge wherever this covering of Drift might be removed. At that time Dr. Britton used the following words: "No fossil leaves or shells have been taken from the clay of Staten Island, but it is not improbable that they will be found at some future time, when the excavations are more advanced than at present. They are more likely to be found in buff or dark colored clays than in fire clay."

All subsequent geologists followed on the same lines, and on all geological maps of this vicinity the existence of Cretaceous strata on the south side of the Island is indicated. The actual knowledge upon which this assumption was based was, however, very fragmentary and unsatisfactory. The only known exposures of Cretaceous clay were at Kreischerville and in a ravine at Princes Bay, and how far these extended was not known. Nevertheless, every observant geologist knew what ought to be and took it for granted that Dr. Britton's conclusions were correct.

Definite evidence in regard to the subject has been slowly accumulating, and, especially during the past three months, important facts have come to light.

Some of these facts were recorded by me at the time of discovery, in our Proceedings. Others have never been placed on record. Following is a brief review of their sequence.

In June, 1883, a single cast of a large shell was found by Mr. W. T. Davis, on the surface of a sandy field, at Tottenville. It was identified by Prof. R. P. Whitfield, of the American Museum of Natural History, as *Pachycardium Burlingtonense*, Whitfield; but its significance was not realized by us and it was regarded as most likely to be an accidental stray.

In November of the same year I picked up, on the shore at Tottenville, a few blocks or concretions of ferruginous sandstone, containing fragments of vegetable remains, evidently similar to specimens previously found at Keyport, N. J., and Glen Cove, Long Island. The identity of these was at once noted by Dr. Britton and they were declared, almost with certainty, to be of Cretaceous age. (See Proceedings, Nov. 10 and Dec. 8, 1883.)

In November, 1885, fossil vegetable remains were found in one of the clay beds at Kreischerville. They were too fragmentary for determination, but were apparently identical with similar remains from the Amboy clays. (See Proceedings, Dec. 12, 1885, and Feb. 13, 1886.)

During the Autumn of 1888 a single fossil leaf was found by Mr. Gilman S. Stanton, in a block of ferruginous sandstone at Arrochar, which fortunately came to my attention and was kindly turned over to me. As in the case of the *Pachycardium* found at Tottenville, however, its importance was not realized at the time, and the opinion was expressed by me that it was probably of Drift origin. (See Proceedings, Dec. 8, 1888.)

Outcrops of what was apparently Cretaceous clay and gravel were next discovered on the shore and in the ravine at Princes Bay, on the shore at Eltingville, and in a gravel pit on the north side of the Fingerboard road at Clifton. (See Proceedings, March 14, April 11, May 9, and Oct. 10, 1889.)

In the meantime the material from Tottenville was accumulating, some of the specimens being in far better condition than those at first discovered, so that they could be accurately studied and the species of plants determined, leaving no question as to their Cretaceous age. All the organic remains thus far found were vegetable; no animal remains having been even indicated, if we except the single *Pachycardium* previously mentioned.

On May 1, 1889, Dr. N. L. Britton and myself were exploring the clay beds along the Raritan River, at Perth Amboy, where we found ferruginous sandstones and concretions containing molluscs, but in all other respects identical with the leaf-bearing concretions from the shore at Tottenville. This encouraged us to believe that careful search on Staten Island would probably yield similar results, and such has been the case.

In October, 1891, I found molluscs in the concretions at Tottenville, and immediately afterwards at Arrochar. These and the ones from Perth Amboy were submitted to Prof. Whitfield and by him identified as Cretaceous species.

Finally, in November, 1891, I found well preserved fossil leaves of undoubted Cretaceous species on the shore at Princes Bay, in concretions in all respects similar to those from Amboy, Tottenville and Arrochar.

Following is a list of the molluscs, as far as they have been identified:

Corbula sp?, (possibly a new species)
Perth Amboy.

Terebratella Vanuxemi, Lyell and Forbes, Tottenville.

Pachycardium Burlingtonense, Whitfield, Tottenville.

Cardium (*Criocardium*) *dumosum*, Conrad, Arrochar.

Ostrea plumosa, Morton, (?) Arrochar.

Aphrodina Tippiana, Conrad, or } Arro-

Cullista Delawareensis, Gabb, } char.

Gryphaea sp. ? Arrochar.

In addition to the above there are several species which are not in a sufficiently good state of preservation for determination. Of the vegetable remains the commonest species is *Laurodendron simplex*, Newb. *Protæoides daphnogenoides*, Heer, *Eucalyptus Geinitzi*, Heer, and other characteristic Cretaceous plants are represented, besides a number more, among which there may prove to be undescribed species. This material will be the subject of further study.

With the foregoing facts in our possession we are now in a position to feel reasonably sure that the prediction of the existence of Cretaceous strata beneath the Drift in the towns of Westfield and

Southfield has been verified, but other points of interest yet remain to be discussed. The first of these is in regard to the character of the rock in which the organic remains are found. Its concretionary nature is apparent—the nucleus in all cases having been a mass of clay in which is enclosed the mollusc or leaf, as the case may be. Limonite often forms as a succession of layers over the outside and the clay is gradually transformed into a hard clay iron-stone. A large series of specimens collected show every stage in the process of formation, from soft clay to hard rock. In the softer material some of the carbon of the vegetation may yet be seen, but in the hard rock nothing except the impressions of leaf or stem remains. Finally, the question will naturally be asked, are these fossils in place where found? Some doubt was felt in regard to the specimens from Tottenville and Princes Bay, inasmuch as they were evidently washed out of the banks, the mass of which is composed of Drift material, in places enclosing considerable clay and yellow gravel. This is conspicuously the case at Princes Bay, as noted by Dr. N. L. Britton in the Proceedings of November 8, 1884, and a deep talus, extending to the beach sands, has nearly always covered the base of these bluffs, so that the character of the material at the shore level could not be ascertained. Recent excavations at Arrochar have greatly helped in the solution of the problem, however, and I was fortunate in arriving there when a section was freshly exposed. This section showed at its base a bed of sandy micaceous clay, containing the characteristic ferruginous concretions, lying flat in the plane of the bedding. The next member was a bed of yellow sand and gravel, also containing concretions. The concretions containing the specimens of *Cardium dumosum* were dug by me out of these layers of clay and sand, and in the gravel I found silicified corals, so characteristic of the yellow gravel which overlies the Cretaceous clays in New Jersey. Above these beds, and conformable with them, there is about four feet of modified drift, the entire series dipping at an angle of about forty degrees towards the N. W. Boulder drift covers the surface. That these beds have been subjected to considerable disturbance is evident from the position in which we now find them, and the stratigraphy of the subject would be an interesting matter for future investigation. It is highly probable that these isolated and limited exposures represent a large and probably continuous bed of Cretaceous strata underlying the entire region, as previously predicted.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

February 13th, 1892.

Informal meeting,

Mr. L. P. Gratacap presented about twenty-five species of fossils recently found in Drift boulders on Staten Island, and read the following paper in connection with them:

Perhaps the first notice of Drift fossils on Staten Island, which found a place in scientific publications, is that contained in a short reconnaissance by Prof. James Pierce, published in 1818, wherein this early observer remarks: "A large quantity of detached pieces of copper ore have been found. I have observed petrifications of marine shells in rocks excavated in that neighborhood, twenty feet from the surface and sixty above the ocean." The next notice of importance, and, in this respect, it very much exceeds the former, is that given by Prof. Mather in his survey of the First Geological District of New York State (1842), wherein he speaks at page 178 of the Drift fossils of Staten Island and mentions a "boulder of limestone" which was dug from a well "in the hilly region of the interior of Staten Island, from a depth of about sixty feet." It was crowded with fossils which he refers to the Lower Helderberg limestone. He alludes to two other boulders which were also taken from wells and which he regards as representative of the Lower Helderberg group of strata. Prof. Mather himself "found a small boulder of decomposed rock on the shore near the south-west light-house, filled with fossil remains similar to those of the middle limestone of Becraft's mountain, Columbia county." The contributions of the members of the Natural Science Association have very much extended

the series of fossil-bearing rocks found on our island, and it now includes seven members of the older sedimentary strata which, lying north of us, have contributed, through the agency of ice-carriage, these fragments to the detrital formation of Richmond County. Conspicuous however amongst all these fossil "wanderers" are those of the Lower Helderberg limestone which Prof. Mather speaks of so frequently, and although on our lists many species are referable to the Ori-kany and Schoharie grits, overlying formations, these have been taken from a few masses of drift rock only, and they cannot be considered as numerically as frequent or as generally distributed as the Lower Helderberg specimens. As a very great portion of the northern drift reached our Island over a north-westerly route we might expect a more general recognition of the other sedimentary strata in our transported material. But the Helderberg group is characterized by fissile or semi-slaty beds, while it also in its more compact parts splits up into blocks and more or less cubical masses, and these would have been prepared, by weathering, in great numbers in pre-glacial times before the ice-foot pushed them southward together with enormous quantities of soil, sand, gravel, and stony nodules into the huge ridge we call the terminal moraine. Perhaps weathering had not acted so favorably, for this purpose, upon the harder limestones, the more cleavable and pulverulent slates, or the refractory grits and sandstones. Besides, the Lower Helderberg zone, encircling the interior basin of the continent almost reaches the Hudson river at Hud-

son and Catskill, (offering too the prominence of Becraft's mountain for erosion) and runs southward along the Delaware, and so was a terrain conveniently located for the dispersal of its fragments over the whole path of the ice sheet to the south and east. We may also remark, that these Helderberg rocks have been much overturned in places, dislocated and fractured by faults, and are traversed by two sets of joints, all of which together has had the effect of breaking down its exposures and forming blocks and boulders, preparatory for their transportation southward. In his recent investigation of the Cretaceous at Clifton Mr. Hollick encountered a considerable number of Lower Helderberg drift rocks, and from these a number of fossil species new to our list were recently added. (See Proceedings, December 12th, 1891.) Mr. Hollick has met with more of these interesting northern wanderers, and amongst these some further new species have been determined.

One of these specimens exhibits a weathery red surface of the Lower Helderberg shaly limestone which has become a pulverulent ferruginous crust in which are very well shown some examples of the bryozoan life which flourished in the muddy and sandy shoals of the Helderberg sea. The rock is strewn with fragments of these lace-like fenestrated "sea mats," and with stipes of the stick-like and branching forms. The former, *Fenestella*, is represented by three species, two of which are new to our Island. *F. (Polypora) obliqua*, Hall; *F. (Hemitrypa) biserialis*, Hall; and *F. (Unitrypa) nervia*, Hall. The stick form (*Trematopora*) is readily distinguished by its contrasted structure and may be *T. rhombifera*, Hall. In the centre of this piece of rock is a delicate flattened blade, which under a low power magnifier displays a surface of rectangular meshes arranged in straight rows between longitudinal partitions, and is a very pretty object. This is *Ptilodictya tenuis*, Hall and has not been seen before in our drift fragments. It is also bryozoan in its affinities. The Helderberg sea afforded congenial conditions for the growth of these frondose or compact colonies of polypites, and this block very aptly illustrates the animated and populous character of its waters.

There is on this block an instructive example of a common fossil *Strophomena rhomboidalis*, Wahl; which shows the

cicatrix or scar left in the beak from the closing of the aperture, in the ventral valve, through which in younger stages of the shell the peduncle had been protruded. Forms referable to this type begin in the Lower Silurian rocks with *S. tenuistriata*, continue in the Upper Silurian with *S. depressa* and deepen and strengthen their specific characters in this *S. rhomboidalis* of the Lower Helderberg and Devonian beds.

Amongst the specimens are many vestiges of trilobites, cheek spines, tails and heads. The heads and tails belong to *Phacops Loganii*, Hall, a short crustacean with a pustulose and tumid head, which prevailed in the seas of the Devonian period, and is new to our island list. It forms the type of a family and is easily distinguished from its congener *Dalmanites*, of which a cheek spine upon an accompanying block, is a token, by its rounded body segments and caudate pygidium. These various specimens contain, besides, parts and casts of shells of different species and genera which we have previously recorded. The Lower Helderberg epoch was one, in its faunal aspect, somewhat transitional between the two great zones of life, the Silurian and Devonian ages, and while the palaeontologist discerns in it the vanishing elements of the former, there also comes into view, the dawning zoological characters of its successor.

Amongst Mr. Hollick's specimens were fossil species from the Schoharie grit, and an interesting example of *Dictyonema*, a lace-like organism delineated in black lines upon a dark chert, allied to our living "squirrel-tails" (*Sertularia*) and derived from the Upper Helderberg limestone.

Following are the additions to our previously published lists:

LOWER HELDERBERG.

- Fenestella (Polypora) obliqua*, Hall.
- " (*Hemitrypa*) *biserialis*, Hall.
- Ptilodictya tenuis*, Hall.
- Trematopora rhombifera*, Hall.
- Orthis multistriata*, Vanuxem.
- " *concinna*, Hall.
- Streptorhynchus radiata*, Hall.
- Rhynchonella nobilis*, Hall.
- Phacops Loganii*, Hall.
- Dalmanites pleuroptyx*, Green.
- " *micrurus*, Green.

UPPER HELDERBERG.

- Dictyonema fenestrata*, Hall.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

March 12th, 1892.

Meeting called to order at 8.30 o'clock. The president in the chair. In the absence of the recording secretary, Mr. Joseph C. Thompson was elected secretary *pro-tem*. Messrs. Walter C. Kerr, Oliver C. Geoffroy and Samuel Henshaw were elected active members.

The following paper upon "The Occurrence of Opossums on Staten Island" was read by Mr. Wm. T. Davis:

The opossum was not included in the "Preliminary List of the Mammalia of Staten Island," printed in these proceedings in 1885, as Extra No. 3, as it was thought that they had probably been exterminated, the Kills preventing any immigration from the New Jersey shore where they abound. Subsequently it was learned that one had been shot near New Springville, and more recent inquiry has established the fact that they have never been entirely absent from the Island. Such long intervals, however, elapsed between the captures, that information regarding them was particularly hazy. In 1889, however, the scarcity of opossums on our Island came to an end, which was probably due to the escape of a few captive individuals, and to the two exceptionally warm winters that made it possible for them, and those previously on the Island, to secure a subsistence at a distance from the habitations of men.

In 1889 an opossum, formerly owned by Mr. James Raymond, escaped from Mr. Arthur Hollick on Fort Hill. At Rossville Mr. Ned Vaughn and Mr. Merrick, a blacksmith, each had one of these animals imported from the New Jersey shore, but they also escaped into the woods of the Island.

The record of captures, though no doubt incomplete, is as follows: In the summer of 1889 the county papers mentioned an opossum that was killed at Richmond village, and in the fall of that year I was informed of the capture of another near Eltingville.

In the fall of 1890 a dog owned by Mr. Hankey, of Todt Hill, secured an opossum near a barn where it had taken up its abode, and from whence it sallied forth to devour the late fruit from the neighboring trees. After being attacked by the dog and left for dead, it revived and made off.

The Richmond County STANDARD of Dec. 20th, 1890, stated that "Mr. Thomas Foley shot an opossum at Grassmere on Monday."

In 1891 the accounts of opossums on the Island became particularly numerous. Mr. Hankey's dog again disturbed one from its retreat in a hollow tree, but it escaped. During the summer an opossum was killed on the Woolsey place on Todt Hill, and was very likely one of the animals previously discovered by the dog.

Mr. J. A. Galloway, who resides on the Leonard White place in Middletown, secured an opossum that had been visiting his chickens. He placed it in a room in the barn that had a wire screen on its window. The opossum climbed up to the window, tore a hole in the screen and escaped. About this time Mr. William A. Galloway, living near South Beach, informed me that an opossum had been killed in his neighborhood.

Mr. Peter Nolan, of Richmond, captured an opossum in the fall of 1891, and Mr. Joseph C. Thompson mentioned to me that one had been secured by a dog near the Fort at Clifton. It fell into the hands

of a ducky and was promptly devoured.

On Dec. 15th or 16th an opossum was shot in New Brighton village, near Jersey street, where it had been depredating upon a chicken roost. It was exposed for sale by butcher Bourne, in front of whose store I saw it hanging.

Mr. Wm. A. Galloway, while driving along the Richmond road in December, met several boys with an opossum that had been secured by a dog in a hollow tree in Mersereau's valley, near Garretsons.

On the 20th of December I went to Red Lane, for the purpose of finding the remains of some opossums that I was informed had been killed thereabouts. In the lowland along the Moravian brook, on the Vanderbilt property, there are many willows that are old and decayed and have cavernous recesses about their roots. The opossums had evidently taken up their abode in these trees, and I was able to find two dead specimens in the vicinity, and was told of two others. The individuals found by me were both males.

In this last mentioned instance, I had gone a considerable distance to find an opossum, while all the time one was living close to my home. It had taken up its quarters under Mr. D. R. Norvell's barn, in the adjoining place, and went about its nightly explorations mid the glare of electric lights and within sound of the noises from the village street. This individual was captured by the colored man who had charge of the stable at the time, and was put into a barrel for safe keeping, on top of which was placed several boards and weights. When all was quiet he pushed aside the boards and escaped, but returned to his old quarters. Finally he was captured by the tail as he was hastily retreating under the barn, and I had the pleasure of seeing a live opossum that was, in addition, a Staten Islander.

The brain cavity of the opossum is only about as large as an ordinary horse-chestnut, and the skull is overlaid and protected by the large muscles that move the lower jaw, so that every bone in his skin may apparently be broken and yet leave the brain uninjured. Though he is a remarkably "wooden" animal, and stands with his mouth wide open on most unnecessary and inopportune occasions, yet if you place a broom-stick, for instance, within these jaws, the deep holes that the long teeth leave in the wood are indicative of the animal's great strength.

Mr. Davis also presented the following memorandum:

On the 7th of February, while in company with Mr. Chas. W. Leng in the woods

back of the Moravian cemetery, I found a little bird sticking head downward in a hole in the top of a fence post. It has been identified at the American Museum as the Pine Finch, *Spinus pinus*, and is now recorded for the first time from our Island. The cavity in which it was found, had been made by some wood-boring larva, while the post was still a tree, and was so irregular in form that it might have easily entrapped the bird. On the other hand, it may have been placed there by human agency, though the spot was an unfrequented one, on a steep hill-side, and surrounded by small trees. The bird was fresh, showed no signs of being weather beaten, and had evidently died but a short time before its discovery.

Mr. Davis presented unusually fine specimens of lignite, apparently coniferous, from the clay beds at Kreischerville. The specimens were of the appearance and consistency of jet and contained considerable amber.

Mr. L. P. Gratacap presented a block of sandstone containing a large, perfect fossil leaf. The specimen was said to have been found by a resident of Richmond, in a field near that locality. Neither the rock nor the leaf were such as are known to occur in this vicinity and the specimen was tabled for more careful examination and comparison.

Dr. N. L. Britton presented a large stone axe, found by Mr. Wm. H. Rudkin on the shore at Tottenville. Recent high tides have undermined the bluff upon which the Indian shell heaps are located, and much of the material from above has slid down onto the beach. The axe was found in this debris at the base of the bluff.

Mr. Arthur Hollick, showed recently found specimens of Cretaceous fossil leaves, from the shore at Tottenville. Most of the specimens were duplicates of species previously found and noted. One however, *Liriodendron Meekii*, Heer, is new to the Island.

Mr. Hollick stated that a record should be made of the re-discovery, since the last meeting, of plant remains in the clay pit at Kreischerville, where they were first found and noted six years ago. (See Proceedings, Dec. 12th 1885, and Feb. 13th, 1886). As on the former occasion, however, the specimens found were too fragmentary for accurate determination. They occur thickly massed together in confusion, in a stratum averaging, in the recent exposure, about two feet in thickness. It was not found possible to so separate them as to obtain perfect specimens.

Adjournment at 10 o'clock.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND

April 9th, 1892.

Meeting called to order at 8.30 o'clock. In the absence of the president, Mr. Arthur Hollick was elected chairman *pro tem*.

Mr. L. P. Gratacap submitted the following additional facts in regard to the fossil leaf exhibited at the last meeting.

The specimen was found at Richmond Valley, (not at Richmond as previously reported,) a few rods north-east of the railroad station, in an excavation made for a cellar. It was originally part of a larger slab, about $1\frac{1}{2}$ feet square, which seemed to be imbedded in the Drift of the hillside. No indication of any stratum or layer of material similar to the rock was noted. It was found about four years ago, by Mr. Mesner, from whom the above facts were obtained.

Mr. Hollick remarked that the locality, as corrected, removed one of the elements of improbability, which had caused the specimen to be looked at with suspicion, and that it had now been brought within the area where such a leaf might be looked for. The specimen apparently belongs to the Cretaceous genus *Grewia*, and is contained in a sandstone similar to that of the Dakota group. How it came to be in the position where it was found is more or less problematic, but similar sandstone is found associated with the Cretaceous clays, and it may have been originally in one of these layers, which subsequently suffered erosion and transportation by glacial action, as we know to have been the case with other Cretaceous material in the neighborhood. If such specimens are ever found in place the probabilities are that they will be located in the sandstone layers overlying the Cretaceous clays to

the north and west of Richmond Valley station.

Mr. Joseph C. Thompson exhibited a skin of a large muskrat, which was killed in the basement of his residence, at Clifton, on the morning of April 1st.

Mr. Hollick showed a diorite pebble, with a thin section of the same for microscopic examination. The specimen was found in the Drift at Princes Bay and attracted attention from its coarse porphyritic structure, so different from that of the close-grained diabase common in the vicinity. The thin section submitted to microscopic examination showed it to be a diorite, consisting of hornblende and plagioclase feldspar, the former partly altered to green actinolite. A similar rock was found in place by Mr. Gratacap, on Lambert's Lane, Northfield, and was described by him in the Proceedings for December 12th, 1891.

Mr. Hollick referred to the memorandum in regard to a nest of the Barred Owl having been found near Bull's Head, as noted in the Proceedings of April 11th, 1891, and stated that the birds had again nested in the same tree. On March 12th of the present year a set of three eggs was found by Mr. Charles R. Harte. The tree is located in the same patch of woodland in which the Red Shouldered Hawk nests every year. Mr. Harte transmitted the following note on the subject:

"Having neglected to carefully locate the tree in which I found the owl breeding last year, I had considerable trouble in finding it again, and the female left the nest before I saw her. She flew to a tree near by, but almost immediately flew into the woods, and although I spent some three hours in getting at the nest, I did not see her again. The male very discreetly kept out of sight from the start. As before the three eggs were on a bed of dead leaves, and although incubation had hardly begun, were very much soiled and nest-stained. So far as I could see, there were no animal or bird remains either in or about the tree."

Adjournment at 9.30 o'clock.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

May 14th, 1892.

Informal meeting:

Mr. Sanderson Smith presented the following paper:

NOTES ON THE SHELLS OF THE JOHN J. CROOKE COLLECTION.

When I first undertook to prepare a notice of this collection for our Association, I had hoped that the great amount of Staten Island material which it contained might enable me to make some additions of importance to the list of Staten Island shells, * and thus to carry out the plan we have always adopted of confining our papers, as far as possible, to subjects relating to the Island itself.

A careful examination, however, shows that the material from the Island is almost entirely the same from which Dr. Hubbard and myself prepared our Staten Island catalogue. ** Some of the rather obscure species of *Limnæa* may finally prove to be additions.

There are one or two species which it may be well to again note as especially abundant or characteristic on Staten Island. The curious little *Helix labyrinthica*, Say, is unusually abundant in one or two localities towards the South. The *Martesia Smithii* of Tryon, which was first discovered in Staten Island oyster shells, has never, so far as I know, been found so abundantly anywhere else, although I very much doubt whether all the specimens have not, in reality, been brought from the Southern States. *Pandora trilineata*, Say, is also unusually common and the curious short form of *Macra solidissima*, to which the name of *Macra similis*, Say, is generally, and I think, correctly, given, is exceeding characteristic of the region about the

forts, whilst scarcely found on the Coney Island shore opposite. *Pecten irradians* still remains excessively scarce.

The claim of the Crooke collection, therefore, to notice, must mainly depend upon the fact of its very long abode on Staten Island.

It is, in the main, a collection of land shells, and is in that department one of very great value, both from its extent and from the great number of species authentically named either by the original authors or by the very best authorities on the subject. A very large part of the West Indian and South American shells came from Mr. Thomas Bland, the Pacific shells from Mr. Pease.

The series of the subgenera of *Helix* characteristic of and almost confined to Madeira, the Canaries and Cape de Verde Islands (*Ochthephila Actinella*, *Tectula*, *Craspedaria*, *Discula*, *Callina*, *Hemicycla Plebecula*, *Leptaxis*, as well as *Janulus* a subgenus of *Patula*) most of which are rare in collections, is one of the best I have ever seen, comprising sixty-six species, of which forty-six were not previously included in the collections of the American Museum of Natural History, which hitherto possessed only twenty-nine species belonging to these subgenera from these Islands.

From the Pacific Islands the series is a very good one, especially of the subgenera of *Patula Trochomorpha* and *Nanina*.

Australia and Tasmania, as well as India, Ceylon and Borneo are also well represented.

From the West India Islands a large part of the species are represented. Among the Haytian shells I was very

much interested in finding a number of species collected for me many years ago in Hayti, presented to Mr. Bland, sent by him to Pfeiffer in Germany, described by him, transferred by Bland to Mr. Crooke and thus finding their way back to my charge. It may be interesting to mention, as showing how much may be expected in partially explored regions, that my brother, who knew nothing of shells, and simply picked up all that he could find, collected, in about twenty minutes search, on the walls of an old fort on a mountain near Aux Cayes, between thirty and forty species of land-shells, of which about a dozen were new species, and many of the others were exceedingly rare.

The series of land-shells of the United States is a very valuable one for geographical distribution and largely increases the number contained in the general collection, although it probably adds no species to those contained in the Binney and Bland collection of the land-shells of the United States, in the possession of the American Museum of Natural History.

The collection of operculate land-shells is almost as good as that of the inoperculates, but space will not permit of my entering into details.

Some idea of the character of the Crooke collection of land-shells may be derived from the fact that, although the Museum collection was already a very good one, the Crooke collection added sixty-five or seventy per cent. to the number it previously contained.

Besides the land-shells, the collection contained a very good set of fresh-water shells, especially of the United States. Of the *Uniones*, a large number were named by Mr. C. M. Whatty, one of the best authorities on the subject.

Mr. Crooke does not seem to have interested himself much in marine shells, of which the collection is a small one.

Botanical notes, with specimens, were presented by Mr. Arthur Hollick as follows:

Polytrichum piliferum, Schreb., Bogardus' Corners; *P. Ohioense*, Ren. and Cardot, Princes Bay, and *Barbula papillosa*,

Muell., New Dorp, are additions to our previously published list of mosses. They were identified by Mrs. N. L. Britton. *Potamogeton spirillus*, Tuckerm., found by Mrs. Britton at Court House; *Plantago aristata*, Michx., from filled in ground at St. George, and *Salix fragilis*, L., var. *latifolia*, And., from a brook side on Todt Hill, are additions to our flora since the last appendix was published.

Memoranda upon the following sparingly represented plants have been noted during the past year in our Proceedings: *Liatris spicata*, (L.) Willd., Mariners' Harbor, *Tilia Americana*, L., New Springville, and *Medicago sativa*, L., Princes' Bay bluff. The following additional may now be mentioned:

Pyrola secunda, L., in sandy woods near Bogardus Corners. Only known previously from a specimen found in 1886 near New Springville.

Tipularia unifolia, (Muhl.) B. S. P., Tottenville. This orchid can no longer be classed as rare on Staten Island, as it has been found, now, almost throughout the entire area. It has usually been detected during the winter and spring by means of its leaves. The number of flowering specimens collected has been few.

Helonias bullata, L., still exists in the small swamp near Kreischerville, where it was discovered many years ago. A special journey was made to the locality on May 1st, of the present year, at which time several promising spikes of flowers were found in bud. Around the borders of the same swamp the cranberry (*Oxycoccus macrocarpus*, Pers.) grows in considerable abundance.

Cyperus speciosus, Vahl., Court House. *Kalmia angustifolia*, L., Bogardus Corners.

Clematis ochroleuca, Ait., with incised leaves, was found represented by a few individuals amongst the typical species, on Todt Hill, on May 8th.

Mr. Walter C. Kerr exhibited a set of twenty-five tide charts of New York harbor, giving the direction and velocity of flood and ebb currents at intervals of each thirty minutes for the tidal day. Notes upon the same were presented for future publication.

* Proc. Nat. Sci. Assn. S. I., Extra No. 5, March, 1887.

** Ann. Lyc. Nat. Hist., May, 1865.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

Special No. 12.

June, 1892.

[Read May 14th, 1892.]

Mr. Walter C. Kerr exhibited a set of twenty-five Tide Charts of New York Harbor, giving the direction and velocity of flood and ebb currents at intervals of thirty minutes for the tidal day, with the following notes:

The area charted extends from the middle of the Upper Bay to Sandy Hook Lightship and into Raritan Bay, two miles west of Old Orchard Shoal Buoy, thus covering about 180 square miles of water and including ten miles of the Staten Island shore, from St. George to Great Kills.

The flood currents are shaded proportionally to strength in blue, and ebb currents in red, on blank forms 19 in. x 13 in., lithographed from a pen tracing of shore lines, with all bars and shoals shown by stippling. Marginal notes give exact data on times and velocities of important currents.

The charts are numbered in thirty minute intervals by elapsed time from high or low water, and a note instructs that for practical use a clock should be set to noon at time of high or low water at Sandy Hook, thus keeping elapsed time for ready reference.

These charts were prepared from personal observation of the currents during 1887-1889, and from such other data as could be secured, especially from the Coast Survey measurements in 1888 of times and velocities of the principal channel currents at maximum and slack water. They are believed to be the only set of tidal current charts ever prepared for New York harbor.

To properly understand the tidal cur-

rents the harbor must be considered as a basin, irregular both in depth and outline, composed of three main divisions, Sandy Hook Bay, Raritan Bay and New York or "Upper" Bay. This basin is separated from the sea by a bar extending from Long Island to Sandy Hook, through which there are three important channels. This bar is a serious obstruction to flowing water, and as the tide rises or falls at sea the tidal slant causes an overflow into or out of the harbor basin, quite uniformly at first, but as the slant increases the lesser resistance of the channels causes currents of considerable velocity.

Sandy Hook Bay having easiest access to the sea fills first and empties first. Raritan Bay in close connection with Sandy Hook Bay fills and empties second, while New York or Upper Bay, far removed from the main basin and separated by the severe constriction of the Narrows, fills and empties last. The difference in time thus established obviously affects the currents as the bays progressively fill and empty. In addition it must be considered that while each bay in turn fills mainly from the sea, it must empty its constant tributary waters. Sandy Hook Bay empties the Shrewsbury, Raritan Bay and Raritan River, while the Upper Bay empties the Passaic, the Hudson and a large quantity of water from the East River, due to the difference in tidal time and level between the harbor and Long Island Sound. Thus the ebb is not the counterpart of the flood, its currents being variously changed and generally augmented. The flow of water under these conditions,

and as modified by the resistance of varying depth, becomes the Harbor Currents.

It has been the purpose of these charts to arrange seriatim the effect of these rather complex conditions, and with the adoption of a sufficiently short interval of time, 30 minutes, to gain accuracy by inspection of the charts in series, correcting and grading them while simultaneously in course of preparation, interpolating between known data, constantly considering the shape and resistance of the basin, and depending upon the inertia of a large mass of moving water to resist change of course or velocity. The tidal day comprising a closed cycle facilitates this method.

As reproduction of the charts in the proceedings of the society is impracticable the following description will indicate some of their leading features:

Chart 1. 0 hours 0 minutes after high water at Sandy Hook, shows flood fairly strong in the Narrows and light elsewhere, with highwater stand in Raritan Bay.

Chart 2. 0 h. 30 m. after h. w. at S. H., shows flood in Narrows and over east bank with high water stand throughout most of the bay. The ebb just starting around Sandy Hook.

Chart 3. 1 h. 0 m. after h. w. at S. H. shows flood in Narrows and along Coney Island shore. The ebb setting eastward over Lower Bay and bar.

Chart 4. 1 h. 30 m. after h. w. at S. H., shows the very last of flood in the Narrows and the easterly set of the lower Bay ebb increased. Sandy Hook current fairly strong.

Chart 5. 2 h. 0 m. after h. w. at S. H., shows ebb just starting on east side of Narrows, and in the Lower Bay easterly set much increased. The Sandy Hook current running fair through main channel. Slack water on Staten Island shore, which on west bank remains slack until the very last of the ebb.

Chart 6. 2 h. 30 m. after h. w. at S. H. Shows ebb throughout Narrows, while the general easterly set throughout the lower Bay feels the resistance of the bar as its velocity increases, causing currents which tend to run fair with the channels.

Chart 7. 3 h. 0 m. after h. w. at S. H., shows well developed ebb in the Narrows, current generally eastward throughout Lower Bay, while strong currents run fair through the Main, Swash and Gedney's Channels, having nearly reached their maximum velocity.

Chart 8. 3 h. 30 m. after h. w. at S. H. The ebb in Narrows is rapidly increasing,

the constriction holding water back and increasing the slant. Until this time the Narrows ebb has poured out through East Channel, which is the natural continuation of the Hudson River; but the augmented velocity due to increased slant causes this current or river to overflow its banks at the west end of the Romer Shoal, and mingling with the easterly currents from Raritan Bay, diverting their course southward and emptying with them through the Swash and Main Channels. This chart also shows how the confluence of currents from the main and Swash channels unite to create the wash which causes Gedney's Channel. The Main, Swash and Gedney's Channel currents are now maximum,—2.2 knots.

Chart 9. 4 h. 0 m. after h. w. at S. H. The ebb in Narrows and East Channel has greatly increased; the strong current running close to Staten Island shore at Fort Wadsworth and along the west bank. Elsewhere, currents are slightly reduced and not materially changed in direction.

Chart 10. 4 h. 30 m. after h. w. at S. H. The Narrows and East Channel ebb currents are now at maximum, 2.2 knots, and elsewhere materially reduced.

Chart 11. 5 h. 0 m. after h. w. at S. H. All currents reduced in strength. The north and south current at Southwest Spit having to turn sharply to eastward to empty through Main Channel yields to the lessened resistance by early emptying of Sandy Hook Bay, and tends to set southward into the latter.

Chart 12. 5 h. 30 m. after h. w. at S. H. Currents much weakened, except in Narrows and East Channel, and increased set into Sandy Hook Bay.

Chart 13. 6 h. 0 m. after h. w. at S. H., or, adding 15 min., 0 h. 0 m. after low water at S. H. Same general conditions as Chart 12, except all currents further weakened.

Chart 14. 0 h. 30 m. after l. w. at S. H. With a fair ebb still running through the Narrows, slight currents through all channels, and low water stand in Raritan Bay, the set into Sandy Hook Bay continues. This set has produced a slight rise or miniature flood behind Sandy Hook, causing a slight ebb current around the point. All currents now running are caused by the flow from the higher level of the Upper Bay through the constricted Narrows, the Lower Bay having emptied.

Chart 15. 1 h. 0 m. after l. w. at S. H. A fair ebb still continues through the Narrows, setting southwestward and a faint ebb around the point of Sandy Hook, while the flood running down the

slant from seaward finds first ingress along the north edges of the Main and Swash Channels.

Chart 16. 1 h. 30 m. after l. w. at S. H. The Narrows ebb continues, and with strong southwest set, due to the resistance of the incoming flood from the southeast. The flood is breaking over the bar and fairing with the channels.

Chart 17. 2 h. 0 m. after l. w. at S. H. The Narrows ebb persists, though strongly crowded to the westward by the incoming flood, which is running fair with all channels and especially into Sandy Hook Bay. The flood crowding in between Coney Island Point and West Bank sinks and runs under the ebb so that a cross section of the Narrows would show flood on bottom in mid channel and nearly to the surface on the Long Island shore, while the whole surface is ebb.

Chart 18. 2 h. 30 m. after l. w. at S. H. The flood running in strongly from the southeast has nearly filled the Narrows, though the ebb still persists on the surface. The flood is visible on the Long Island side and in Stapleton Bay, Staten Island, where it is reflected upwards by the shoaling bottom. This presents the strange occurrence of an ebb current running between two flood currents. All water delivered during the last two hours of the Narrows ebb is deflected over West Bank into Raritan Bay.

Chart 19. 3 h. 0 m. after l. w. at S. H. The ebb has entirely ceased, leaving a strong flood running through the Narrows. Sandy Hook and Raritan Bay are filling from currents running fair with the bar channels, the set being generally westward inside of the bar.

Chart 20. 3 h. 30 m. after l. w. at S. H. The flood has reached a maximum velocity of 1.7 knots in Gedney's, Main and Swash Channels. The incoming flood from seaward approaches nearly parallel with the New Jersey coast, but the angle at which it strikes Long Island causes a westward set along the South Shore, increasing towards the bar, creating a strong current off Coney Island and over the East Bank. This is the strongest flood.

Chart 21. 4 h. 0 m. after l. w. at S. H. Currents generally the same as in Chart 19, except slightly reduced velocities in Gedney's, Main and Swash Channels and Raritan Bay, while velocities are increased in East Channel and Narrows. As the

flood meets the bar its most direct course is through the Swash Channel. This channel does not supply much water to Raritan Bay, its contents setting northward around the west end of the Romer Shoal and passing through the Narrows. As its current, however, remains strong after the East Channel current has augmented until the latter fills the channel east of Swinburn and Hoffman Islands, there is a tendency to break over the shoals and discharge the Swash Channel towards New Dorp, Staten Island, thence northeastward along South Beach, joining the East Channel current just below the Fort. This current keeps open the 13 foot channel marked by the Fort Wadsworth bell buoy. The soft West Bank, with its islands, remains intact as these currents sweep each side of it.

Chart 22. 4 h. 30 m. after l. w. at S. H. Currents all reduced except in East Channel and Narrows where they are now maximum, 1.7 knots.

Chart 23. 5 h. 0 m. after l. w. at S. H. Sandy Hook Bay has filled. Flood now setting directly west through Main Channel into Raritan Bay.

Chart 24. 5 h. 30 m. after l. w. at S. H. Raritan Bay has filled and the current through Main Channel deflects sharply northward towards the Narrows where strong flood is still running on the slant, due to the constriction which retards the filling of the Upper Bay.

Chart 25. 6 h. 0 m. after l. w. at S. H. This plus an interval of 10 minutes returns to the conditions of Chart 1, and the cycle of the tidal day—12 h. 25 m.—is complete.

It will be noted that in the channels the maximum ebb currents, 2.2 knots, are stronger than the maximum flood currents, 1.7 knots; that the strong flood enters along the Long Island shore over the East Bank, while the stronger ebb empties through the Main, Swash and East Channels. Thus the flood washing in debris is severely obstructed, while the superior ebb concentrates its scouring action on the principal channels, keeping them open. It is therefore essential to commerce that in harbor and river improvements the augmentation of the ebb by the waters of the Hudson and the East River be preserved, and that no diversion of the flood from its present harmless course be attempted.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

September 10th, 1892.

Meeting called to order at 8.15 o'clock.

In the absence of the president and secretary, Mr. Walter C Kerr was elected chairman and Mr. Arthur Hollick secretary *pro tem*.

The recent death of Mr. George William Curtis was referred to by several members and the following minute was subsequently adopted:

This Association recognizes, in the death of Mr. George William Curtis, the loss of one of its earliest honorary members and an earnest friend, whose advice was always at its service and whose sympathy with the objects and aims of the Association was always to be relied upon.

We realize that the moral support which Mr. Curtis gave to this Association, and its recognition by him as an important factor in the intellectual life of Staten Island, has contributed largely to its success in the past and is an incentive to continued activity in the future.

Mr. Wm. T. Davis exhibited specimens of and read the following paper on some interesting oak trees recently discovered by him near Watchogue:

In the *Scientific American* for September 3rd, 1892, a new hybrid oak that grows on our Island at Watchogue is described, and I have there named the form *Quercus Brittoni*, after Dr. N. L. Britton, who with Mr. Arthur Hollick has catalogued the flora of the Island.

The parents of this hybrid are *Quercus nigra*, L., and *Quercus ilicifolia*, Wang., both of which are known to cross with other oaks. *Nigra*, according to the last edition of Gray's Manual, crosses with the Shingle and the Willow Oaks, the latter named form, *Quercus Rudkini*, Britton, being one of those found at the other end of the Island in 1888. (Proc. N. S. A., S. I., Sept 8th, 1888.) *Illicifolia* is supposed to cross with the Scarlet Oak.

Half a dozen of the Watchogue hybrids show very plainly their relationship to

both of their parents, some of the trees presenting a mixed foliage ranging from the wedge shaped leaves of *nigra* to the four or five lobed *ilicifolia* pattern. The different forms of the leaves are shown in the accompanying five figures, which represent the varied character of the foliage on a single branch. The leaves are rusty-pubescent beneath, the pubescence being more generally spread over the surface than in *nigra*, though not so close as the white down in *ilicifolia*. The bark and height of the trees also show those intermediate characters to be expected.

Only two abortive acorns, that were produced this year, and several broken cups of last year's growth were discovered, but the trees retained their dry catkins in place throughout the summer. This habit is nearly confined to *ilicifolia* as compared with *nigra*.

Q. ilicifolia is not known to grow at the western end of the Island, but *Q. nigra* occurs there in abundance, and a diligent search among the trees resulted in the finding of no such forms as are here described.

Near the trees of *Q. Brittoni*, but standing in low moist ground, there is a remarkable oak, that in every character, except size, is a typical *ilicifolia*. It once stood about twenty-five feet high, as proved by measuring the now partly prostrate trunk, which is sixteen inches in circumference several feet from the ground, and bears five fairly large branches. It is still clothed with leaves and produces a few acorns, but probably will not live over one or two years more, owing to its injured condition.



Quercus nigra x *Quercus ilicifolia* = *Q. Brittoni*



Quercus nigra x *Quercus ilicifolia* = *Q. Brittoni*

The maximum height given for *Quercus ilicifolia* in the last edition of Gray's Manual is 8 feet, and Loudon gives 10 feet under favorable circumstances. Several of the neighboring *ilicifolia* trees equal this measurement of ten feet, but even they, at best, are only as large as one of the branches of the tree under consideration. It perhaps may not be a pure *ilicifolia* though there seems to be no evidence to the contrary save its great size as compared with that commonly reported for a tree of this species.

These Watchogue oaks are as noteworthy as those occurring at the other end of the Island, and certainly make an interesting addition to our flora.

Mr Arthur Hollick exhibited specimens of granite and read the following paper in connection with the same:

During the past year a dangerous reef was discovered at the mouth of the Kills, near St. George landing. It had not been manifest until vessels of large draught began to go to and from the Standard Oil Works at Constable Hook. Several had struck there and its removal became necessary. Last May blasting operations were in progress and on the 18th of that month I visited the scow in order to ascertain the nature of the rock composing the reef. A large quantity had been blasted away and dredged up—all a coarse pegmatite granite, exactly similar to the outcrop south of the old Tompkinsville landing. The line of strike from this outcrop to the reef is approximately N. 15 deg. E., about what we should expect it to be if continuous to the eastward of the serpentine ridge.

Large numbers of fish were killed and stunned by each explosion and one species in particular was in such abundance as to cause considerable comment, especially as it was not known or recognized by fishermen and others familiar with the fish along our shores. Several were secured and transmitted to Mr. Sanderson Smith, at the American Museum of Natural History, who contributed the following memorandum: "After a careful examination I feel sure

that the slender fish, of which you send three specimens, is the Silver Hake (*Merluccius bilinearis*, Mitchell), also called the New England Whiting. Its appearance in our waters, especially around New York, seems to be very irregular, though where it is seen on the coast of New England it is generally in large numbers." It is described and figured in DeKay's Natural History of New York, with the remark that "on the coast of New York it is very rare, while further north it is very numerous." Their appearance along the shores of Staten Island in such numbers this year is therefor perhaps worth recording.

Mr. Hollick also contributed the following memoranda: About 8 o'clock on the evening of November 2nd of last year a common snow bunting (*Junco hyemalis*) made its presence known at one of the windows of my house and was allowed to enter. It was captured and placed in a cage, where it soon became quite tame and apparently thoroughly at home and contented. Towards Spring it began to sing and became such a favorite that we did not like to think of parting with it, but on May 15th it solved the difficulty by escaping. For several hours it remained close to the house, in the trees and on the walks, allowing us to approach within a few feet before taking flight. This is the first instance of which I have heard in regard to the snow bunting as a cage bird.

A bed of fossil leaves, similar to those found at Kreischerville, has recently been discovered at the bottom of a clay pit at Green Ridge, but the specimens were too fragmentary for determination. The discovery was made by Mr. Heinrich Ries, while engaged in examining the clays of the Island for the New York Geological Survey, with whom the locality was visited on Aug. 2d, at which date the specimens were collected.

Mr. Davis presented a finely preserved specimen of a conifer, from one of the Kreischerville clay pits, identified provisionally as a *Juniperus*.

Adjourned at 9.15 o'clock.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

October 15th, 1892.

Informal meeting.

Dr. N. L. Britton exhibited leaves and fruit of the species of *Fraxinus* native to Staten Island and read the following paper:

THE ASH TREES OF STATEN ISLAND.

It has been my pleasure to spend several days of this Autumn on Staten Island with Mr. Romeyn B. Hough, of Lowville, New York, who is engaged in bringing together material for an exhibit of the trees of this State, at the World's Columbian Exposition next year at Chicago. Mr. Hough hopes to be able to show photographs of every species, taken both when the tree is in full leaf and after the leaves have fallen, from the same individual if possible, also a log of the wood and mounted specimens of flowers, foliage and fruit. I was glad to be able to direct him to numerous typical isolated trees, with the result that many of them will adorn the Chicago exhibit.

Among the species that he was especially anxious to obtain was the Green Ash, (*Fraxinus viridis*, Michx. f.) and he was disappointed when I told him that I was not aware of its occurrence in southern New York, although from a specimen in the herbarium of the Association I appear to have collected it at Richmond in 1879. It is not however recorded in the catalogue of plants of Richmond County, published by Mr. Hollick and myself in 1879, nor in any of the subsequent appendices to that list, printed in the Bulletin of the Torrey Botanical Club, nor is it given in Dr. O. R. Willis' Catalogue of the Flora of Westchester County. We were both, consequently, more than pleased when we located two very fine specimens of

this tree, during our first day's exploration. One of these stands in a field near a fine group of American Elms, a few feet east of Vanderbilt avenue, Clifton, near its junction with the Richmond road, and is so conspicuous that it is strange some of us have not noticed it before. It is a round topped tree, some 50 feet high, with elongated lanceolate and lance-oblong leaflets. We could find no fruit. The other individual is a tree with which I have long been familiar standing in an open field north of Tysen's Lane, between New Dorp and Oakwood at a point about one-fourth the distance between the Mill road and the Staten Island Railroad. I had, however, never visited it when in foliage, and hence had never been sure of the species. It is a taller tree than the one near Clifton and has broader leaflets. Some few bunches of fruit were found on the ground, evidently some time fallen. The wing of the samara is broadly oblong and wider than it usually is in this species. These fruits appear from this observation to fall much earlier than those of the Red Ash, (*Fraxinus pubescens*, Lam.) which were seen the same day still remaining on trees in the vicinity.

Fraxinus viridis may be distinguished from *F. pubescens*, our most common species, by its glabrous twigs and leaves, the latter dark green, both sides, those of *F. pubescens* being densely velvety. *F. Americana*, L., has glabrous twigs but its leaves are pale beneath and often slightly pubescent and its samaras are margined by the wing only at the apex and are blunt at the point of attachment, while those of the two other species are

more or less margined nearly to the acute point of attachment. The only other native species which is likely to be found in the county is the Black Ash, (*Fraxinus sambucifolia*, Lam.) which differs from all the preceding in having its lateral leaflets sessile and its samaras oblong, blunt at each end or notched at the apex and margined all around. It has been found in Essex and Bergen Counties, New Jersey, and is reported from Freehold, Monmouth Co., N. J.

Mr. Arthur Hollick reported that during the past Summer he had assisted the U. S. Dept. of Agriculture in making a collection of the worst weeds of the region for the National exhibit at the Columbian Exposition. The species desired were *Galinsoga parviflora*, Cav. and the common plantain, (*Plantago major*, L.) The former has already become a great pest in some gardens in New Brighton but it is of such recent introduction that no common name has yet been given to it. While collecting the *Plantagos* a number of specimens were taken indiscriminately from patches where they occurred in great numbers, but upon careful examination about two-thirds were found to be *P. Rugelii*, Decne, and some search was necessary in order to secure the twenty five specimens of *P. major* desired. The two species are so closely allied that a superficial exam-

ination is often inadequate to separate them, and unless special attention has been called to the matter the differences are seldom noticed.

The most conspicuous characteristics to be noted are: *P. Rugelii*, larger, coarser, generally more purple at the base of the leaves and flower spike. Spike more tapering and pointed, pods long, erect, more or less appressed to the spike and 4-9 seeded.

P. major, smaller, generally green throughout. Spike blunt and thicker, pods short, standing out from the spike at a considerable angle, 8-18 seeded.

Observations on the relative abundance of the two species in other localities would be of interest, as they have doubtless often been confused or classed collectively as *P. major*.

Mr. Hollick also read letters from Dr. Fredk. J. H. Merrill, Asst. Director of the New York State Museum, requesting contributions of the flora, fauna and minerals of the Island for the State Museum and asking for assistance in securing a collection of Staten Island clays for the New York State mineral exhibit at the Columbian Exposition. Mr. Hollick stated that he had made arrangements to begin collecting the specimens of clays desired within the next few days.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

November 12th, 1892.

Meeting called to order at 8.45 o'clock, at the residence of Mr. Thomas Craig, Westervelt avenue; the president in the chair. In the absence of the recording secretary Mr. Joseph C. Thompson acted as secretary *pro tem*. This being the annual meeting reports of officers for the past year were submitted and approved as follows:

The treasurer reported an income, including balance from previous year, of \$195.09; expenses amounting to \$70.70; leaving a balance on hand of \$124.39. The recording secretary's report showed an active membership of 36. The curator reported 148 additions to the library, received in exchange for the Proceedings, besides several donated and others purchased and 59 additions to the museum, mostly geological and archaeological specimens. The corresponding secretary reported fifteen communications received and answered and three new exchanges effected, viz.: Buffalo Society of Natural Sciences, Kansas University Quarterly and Society pro Fauna et Flora Fennica. The proceedings of each meeting were edited and abstracts prepared for the local press.

The election of officers for the ensuing year resulted as follows: President, Walter C. Kerr; treasurer, Thos. Craig; recording secretary, Joseph C. Thompson; corresponding secretary, Arthur Hollick.

A paper on "Our Historic Landmarks," by Mr. Ira K. Morris, was read by title, and will be published as a "special" later on.

Dr. N. L. Britton presented specimens of *Aspidium cristatum*, (L.) Sw., collected by Mrs. N. L. Britton, near Oakwood.

This fern is exceedingly rare on Staten Island, having been previously reported from but two localities, in one of which, the Clove Lake swamp, it has been since exterminated.

Mr. Arthur Hollick read the following paper upon Additions to the Cretaceous Flora of Staten Island:

At our meeting of January 2nd, 1892, I gave a preliminary account of the Cretaceous fauna and flora of the Island, so far as studied up to that date. At the meeting of March 12th, the re-discovery of fossil leaves in the Kreischerville clays was recorded, and also the discovery of a large fossil leaf near Richmond Valley. At the meeting of September 10th the discovery, by Mr. Heinrich Ries, of fossil leaves in the Cretaceous clay at Green Ridge was recorded and since that time Mr. Wm. T. Davis has turned over to me a number of other specimens found by him in the clay at Kreischerville.

All this new material, and such of the old as had not been critically examined, has been the subject of careful study by me during the past few months, with the result that there has been added at least 38 species to our Cretaceous flora. Most of them were known previously from the clays of Woodbridge or Amboy, N. J., but others have not before been reported from Eastern North America and we here have their first recorded occurrence in this region. Of these, 14 represent species new to science.

The specimens have all been shown from time to time at our meetings, and from these careful drawings have been made. The entire subject will be presented before the New York Academy of

Sciences shortly, with full descriptions and figures of all the new species, which will be published in the *Transactions* in due time.

A complete list of the species is as follows:

Juniperus hypnoides, Heer, Kreischerville. (Wm. T. Davis.)

Frenelites Reichii, Ett., Kreischerville.

Sequoia heterophylla, Vel., Kreischerville.

Sequoia Reichenbachii, Gein., Tottenville.

Sequoia Couttsiae? Heer., Kreischerville. (Wm. T. Davis.)

Pinus, sp? Arrochar, Tottenville and Kreischerville.

Dammara borealis, Heer., Tottenville.

Ficus, sp? Kreischerville. (Wm. T. Davis.)

Populus apiculata, Newb. in mss., Arrochar.

Salix, sp? Kreischerville.

Platanus Aquehongensis, n. sp.

This specimen is the one found near Richmond Valley, which was described at the meeting of April 9th, and referred provisionally to the genus *Grewiopsis*. Careful comparison since then has convinced me that it is a new species belonging to the genus *Platanus*, and I have given it a specific name which will always identify it with Staten Island

Myrica Davisii, n. sp. Kreischerville. Named in honor of our fellow member Mr. W. T. Davis, who has been instrumental in bringing this and so many other specimens to light.

Myrica grandifolia, n. sp. Tottenville.

Laurus primigenia, Ung., Kreischerville and Tottenville.

Laurus Hollæ, Heer., Kreischerville.

Paliurus? sp? Kreischerville and Tottenville.

Diospyros Steenstrupi, Heer., Tottenville.

Kalmia Brittoniana, n. sp., named in honor of our fellow member Dr. N. L. Britton, to whom I am indebted for valuable assistance in comparing the material here listed. Locality, Kreischerville.

Cornus Holmiana? Heer., Tottenville.

Leguminosites frigidus, Heer., Kreischerville.

Acer minutus, n. sp., Tottenville.

Chondrophyllum orbiculatum, Heer., Kreischerville. (Wm. T. Davis.)

Magnolia longifolia, Newb. in mss., Tottenville.

Mujanthemophyllum pusillum, Heer., Kreischerville.

Devalquea insignis, Hos., Kreischerville. (Wm. T. Davis.)

Williamsonia (?) Riesii, n. sp., named in honor of Mr. Heinrich Ries, by whom it was first detected in the clay at Kreischerville

Phyllites Poinsettoides, n. sp., Kreischerville.

In addition to the above there are eight fruits and seeds, whose affinities are entirely problematic, which do not seem to have been anywhere described or figured. They might perhaps be all included under the recognized generic name for such objects, viz.: *Carpolithes*, but further than this it does not seem advisable to go

Some of these names are to be considered as provisional only, and may have to be changed if better material for study and comparison should be obtained.

If to these we add the list previously published,* viz.:

Eucalyptus Geinitzi, Heer., Kreischerville.

Liriodendron simplex, Newb., Tottenville and Princes Bay.

Liriodendron primævum, Newb., Tottenville.

Protæoides Daphnogenoides, Heer., Tottenville and Kreischerville.

Laurus Plutonia, Heer., Tottenville.

Sapindus Morison, Lesq., Tottenville.

Thinnfeldia Lesqueruziana, Heer., Princes Bay.

Rhamnus Pfaffiana, Heer., Tottenville and Princes Bay.

Ficus atariva, Heer., Tottenville.

Dalbergia hyperborea, Heer., Tottenville.

Diospyros primæva, Heer., Tottenville.

Platanus Newberryana, Heer., Princes Bay,

we have 47 species representing the flora of the Cretaceous formation on Staten Island. All the specimens from Tottenville, Richmond Valley, Princes Bay and Arrochar are in ferruginous rock of a concretionary character and are well preserved. Those from the clays of Green Ridge and Kreischerville soon began to disintegrate upon exposure to the air and are now mostly useless for purposes of identification.

There is not the slightest doubt that if excavations are carefully watched throughout our Cretaceous area large additions to the above lists may be expected.

Meeting adjourned at 9.30 o'clock. The next regular meeting will be held, by invitation, at the residence of Mr. Jos. C. Thompson, Clifton.

* Trans. N. Y. Acad. Sci. xi. 102, 103, Pl. ii. iii. vi.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

December 17th, 1892.

Meeting called to order at 8.30 o'clock, at the residence of Mr. Walter C. Kerr.

On motion, the president and corresponding secretary were authorized to represent the Association in all matters which may arise concerning the World's Fair.

The corresponding secretary presented first proofs of the index to Volume II of the Proceedings, to include the three years beginning November, 1888, and was authorized to proceed with the printing of the same.

Printed copies of the paper by Mr. Ira K. Morris, entitled "Random Thoughts on Local Landmarks," read by title at the previous meeting, were presented and will be distributed with the current proceedings as Special No. 13.

Notice was given of a proposed amendment to the Constitution, to consolidate the offices of corresponding and recording secretary into one office, to be known as that of secretary.

A specimen of European "Gorse" or "Furze", sent by Dr. F. Hollick, was shown and the following memorandum read:

The accompanying specimen was obtained November 10th, from a small bush about a foot in height, of European furze, (*Ulex Europæus*, L.,) which is growing wild on Ward's Hill, Tompkinsville. I first discovered it during the early Autumn. To all appearances the plant is self-seeded, and is remote from any garden or cultivated ground. The only other vegetation in the vicinity is short stunted grass, so that the bush in spite of its small size, is a conspicuous object and has probably only escaped destruc-

tion by reason of its sharp prickly foliage. The locality is strikingly similar to the "commons" or "downs" where it grows in Great Britain. How it came here is a mystery, as the only other place where it is known to occur in America, so far as I am aware, is on the island of Nantucket, where it was introduced, about 1860, and has since spread to some extent. If protected and encouraged it would doubtless become established here and spread as it has done in the latter locality.

Mr. William T. Davis exhibited *Cecropia* cocoons which had been partly destroyed by woodpeckers, and read the following paper:

WOODPECKERS AND CECROPIA COCOONS.

The caterpillars of the *Cecropia* moth spin their cocoons in a variety of places; occasionally on the flat side of a board fence, sometimes at the base of bushes such as the elder, and sometimes at the ends of swaying branches when the food plant happens to be a tree. The cocoons spun near the ground are often devoured by mice that gnaw through the silken coats to the edible pupa within. Specimens which had been thus destroyed, were shown to this Association, by Mr. Joseph C. Thompson, on Dec. 12th, 1889. Cocoons that are placed on tree branches are more safe from the attacks of mice, but are liable to be eaten by woodpeckers.

On the 14th of January, 1888, I saw a Downy woodpecker investigating a *Cecropia* cocoon in a white maple, the woodpecker thrusting its bill in and pulling it out of the cocoons quite frequently. After a while it flew to another cocoon a few feet away, but it being on such a small branch it was unable to successfully

pick it open, as the branch swayed up and down. It was then plain what a great protection it was to the insects to place their cocoons near the branch ends, though no doubt they are sometimes killed by the swaying of these branches during a storm.

When the woodpecker was gone, I cut the cocoon off, and found a small hole on its side quite near the branch, where it was easiest to drill because the silken fabric gave way the least to the strokes of the bird. Cutting open the other side of the cocoon, I found that the pupa shell was sucked nearly dry of its contents.

The *Cecropia* cocoons, occurring commonly on white maples, are generally placed near the ends of the long drooping branches, and it will be seen from the foregoing, that it is probably the safest situation afforded by the tree. Near my home there is a small white maple that has eight *Cecropia* cocoons on its branches, but only two of them, from their position can be injured by a woodpecker.

If a woodpecker is successful in making a hole into a cocoon, it is nevertheless sometimes disappointed at its contents. I have found a cocoon that contained the tough case of an *Ichneumon* fly pupa (*Ophion*), which had been drilled in the side by a woodpecker, and then abandoned, leaving the parasite unharmed.

Mr. Davis also submitted the following note :

The Tawny thrush or "Veery" (*Turdus fuscescens*,) has not been reported as nesting on the Island, but during the last Spring and Summer it was not uncommon at Watchogue. Several would often be heard singing at the same time, or be seen walking, hopping or running, for they do all three, along the wood paths and stopping by the way to turn over a countless number of dead leaves for the insects to be found beneath them. In every instance they frequented the edge of the close timber near to some open or half cleared ground, whither they often flew.

On the 26th of June, I noticed a Veery

carrying food in her bill, and was thus enabled after a time, to discover a young bird perched on a log in a thick growth on the edge of a swamp. On the 10th of July, with Mr. Walter Granger, of the American Museum, I heard many Veeries singing, but we were unsuccessful in finding a nest of the second brood.

It seems probable that this thrush has only been plentiful at Watchogue during the past Summer, for just as close attention has been given to the district for a number of years, and yet only once before, namely in May 1891, was a Veery heard singing.

Mr. Arthur Hollick read the following "Notes on Staten Island Clays collected for the World's Fair."

At our October meeting I mentioned the fact that I had been requested to make a collection of Staten Island clays, "kaolins" and fire sands for the New York State mineral exhibit at the Columbian Exposition. The collection has since been completed and I have thought that perhaps the members of this association might be interested in hearing something in regard to the matter.

The specimens were required to be in 10 inch cubes, and in order to insure this requisite strong wooden boxes were furnished, exactly 10½ inches cube inside measurement. They were put together with screws so that they could be taken apart to any desirable extent and readily put together again. A screw driver, carpenter's square and long heavy butcher's knife constituted the necessary outfit for properly handling the clay after it had been excavated in the rough. In the case of a soft homogeneous clay the job was comparatively easy. A mass measuring about a foot each way would be excavated and the top and sides squared to the exact size of the interior of the box. By removing one side of the box it could be readily slipped over the block of clay. The box would then be turned over, the remaining face of clay be shaved off and the side replaced. By this means the contents could shake but little in transportation and the cubes

could subsequently be removed and trimmed down to the required 10 inches measurement.

In some of the clays which were fractured and seamed the operation was more difficult, and the sandy clays, "kaolins," and fire sands it was not found feasible to cut into cubes at all. These latter were simply rammed into the boxes while moist, until the entire interior was packed solid.

Following is a list of the samples collected:

- No. 1.—Kaolin.—Staten Island Kaolin Company, Kreischerville.
- No. 2.—Miniature section of Staten Island Kaolin Co's. bank, showing kaolin with sand and bowlder clay on top.
- No. 3.—Miniature section of B. Kreischer's Sons. old bank, Kreischerville, showing fire clay with fire sand and yellow gravel above.
- No. 4.—Fire clay, mottled red and yellow from latter bank.
- No. 5.—Fire clay, yellow, from same bank as last.
- No. 6.—Fire sand, yellow, from same bank as last.
- No. 7.—Kaolin.—B. Kreischer's Sons. Kreischerville.
- No. 8.—Stoneware clay. Weir bank, B. Kreischer's Sons, Kreischerville.
- No. 9.—Fire clay, blue, same bank as 3, 4, 5 and 6.
- No. 10.—Fire clay, sandy and fractured. Androvette bank; B. Kreischer's Sons, Kreischerville.
- No. 11.—Fire sand, white, from same as Nos. 3, 4, 5, 6 and 9.

The sections were prepared by ramming a layer of each material into the box, in their order of superposition and preserving as nearly as possible their relative thicknesses. Nos. 8 and 9 are the clays in which lignite and other fossil plant remains occur. All the fossils thus far obtained were found in these banks. I have recently received word that all the boxes have arrived safely at the State Museum. The clays, except Nos. 4 and 10 were in good condition—these latter were badly cracked, due to shrinkage. The kaolins, Nos. 1 and 7 were merely shrunk—the latter having shrunk $\frac{3}{4}$ in. thus necessitating a further collection of material. The five sands had settled considerably and the sections had become so mixed as to be of practically no use.

In addition to the material which will have to be duplicated there yet remain to

be collected one or two samples of ordinary building brick clay, building sand and a cube of trap rock from the Graniteville quarries.

Mr. L. P. Gratacap exhibited berries of *Smilax rotundifolia* and submitted the following memorandum in connection with them:

If any one will take the round smooth black berry of *Smilax* which in lustrous clusters beset the naked and thorny branches of this climbing herb, where it is seen amid *Viburnum* bushes and young birch and blackberry and cut it open, he will find three wedge shaped or triangular nutlets embedded in a soft paste, which thinly smears the inner surface of the epidermis and overlies the seed, and on the convex back, at the median position of each nutlet, also enclosed by the pulp, a tendril-like greenish, delicate stem. I do not know whether anything has been said or written about this appendage and bring it to notice for discussion. Generally, perhaps always, there are three of these, clasping the back of the nutlet. They arise from the anterior pole of the berry directly over the peduncle which leaves a hole in the berry skin when the latter is torn away from it, and seem to center in a common attachment directly under the cork-like disk of the deciduous stigmas. What are they? The *Smilax rotundifolia* in its fertile flowers has three stigmas described by Gray as "thick, spreading almost sessile." These short stem seems related to the stigma and appear like abortive prolongations or roots of that organ extended downward and around the nutlets during their formation. Is there any purpose for this and does it exist in other berry, like fruits?

Mr. Gratacap also exhibited drawings, from microscopic examination of rocks to which seaweed had been attached, and read the following note:

The great quantity of rock used in constructing the road bed of the Rapid Transit R. R. along our north shore has introduced upon the island a very representative collection of N. Y. Island rock,

including mica schists, gneiss and granite. It serves the double purpose of affording the local mineralogists an opportunity to study and collect feldspar, quartz and mica, with associated garnets and tourmalines and is a suggestion as well of the underlying reefs of archæan metamorphic masses upon which our own island is built, and our geological relationship with New York from whose ledges the rocks have been transported. Wherever these fragments have rolled down to the waters edge or are so placed as to be inundated by the high tides, a very vigorous growth of the green filamentous seaweed (*Calothrix?*) has appeared. I am not sure that it is more marked than the similar growth over the traps, sandstones and shales which were the previous occupants of the shores of the Island, and which have been somewhat displaced from their intimacy with the waves and currents of the Kill van Kull by these later arrivals, but it does seem to me as if it had developed with interesting rapidity. The schistose flaky character of many or most of these fragments may have conduced to facilitate this luxuriant development; and where, as in the case of granite veins, the

feldspar is coarsely brecciated, the interlacing lines of angular definition between the crystals offer a crevice for attachment. As a fact the lamellar fragments are more quickly invaded.

Placing under a microscope flakes of mica, feldspar and quartz we can see the delicate filaments of the alga penetrating the films of the mica or occupying pits and irregular surfaces of the feldspar with distributed spots of green granules. Sometimes lacunae or minute cavities, situated a little way within the edge of mica flakes, will be filled with the green spore-like groups. A few rude drawings show approximately some of the phases in this process of investment of the rock by the seaweed.

Cumulative effects have of late been much emphasized, and it is not unlikely that the alternating drying and swelling, from exposure to the sun at low and submergence at high water, of this alga may sensibly determine the duration, as a mass, of the more schistose or friable rocks, when the tiny extensions of this subtle enemy have effected an entrance within their substance.

Adjourned at 10.30 o'clock

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

Special No. 13.

December, 1892.

Random Thoughts on Local Landmarks.

[By IRA K. MORRIS. Read by title Nov. 12th.]

Historians,—especially those who have made the customs and habits of ancient Indians a study—have advanced several theories as to the manner of burial rites among the Aquehongas, while in possession of Staten Island.

The relics exhumed in the removal of the sand embankment in front of the old Dongan House at West Brighton, several years ago, seemed to settle the question, in a very great measure at least, that the Aquehongas buried their dead in a manner similar to that of our people to-day, with the exception of the accompaniment of personal property and trinkets.

This theory, however, had a very certain check in the discovery of an Indian grave, at Tottenville, a few days since, by Mr. Richard Christopher, who has charge of the Old Billopp House.

While digging a post-hole, a few feet south of the ancient building, Mr. Christopher struck a flat, brown stone, at a depth of about three feet. This he removed, and found beneath it the perfect skeleton of an Indian child of about ten years of age.

It is reasonable to assume that this grave is at least two hundred and twenty-four years old. The Billopp House has stood that length of time, and as Captain Christopher Billopp, who built it, immediately afterward established the family burying-ground, (in accordance with the strict custom of the day), on a knoll several hundred yards east of his "manor," and "included there the burial of relatives, family slaves and friendly Indians," it does not stand to reason that

the grave of the Indian child could have been made after that date (1668.)

This old burying-ground, which is to-day marked by a single cedar tree, was, a few years ago, desecrated beyond all human reason. Thomas Farmar Billopp, the son-in-law of the original owner, and the father of Colonel Christopher Billopp, of Revolutionary fame, made provision in his will, in accordance with the custom of the day, for the maintenance and perpetuation of this family burying-ground; and long before the Revolution he and his wife, Eugenia Billopp, (whose name the husband assumed at the marriage), were there laid to rest.

Their son, who inherited the property, as is well known, was a bitter partisan in the service of the British King, and when the Revolution was over, he abandoned the old house of his father and grandfather and left the country. The property was then confiscated by the Government, and, of course, all the provisions of the will of Thomas Farmar Billopp became null and void.

It is a fact that Colonel Billopp's first wife, one or two of his children, several other relatives, family slaves and friendly Indians were buried there; yet but two of the old grave-stones have been preserved—those of Thomas Farmar Billopp and Eugenia, his wife.

After the property had passed out of the hands of the Billopps no care seems to have been taken of the old family burying-ground. The graves sank in, head-stones crumbled and fell, the stone fence that encircled it tumbled down, weeds and briars grew up unmolested for years, and it stood for a long time an en-

tangled thicket wherein foxes, reptiles and wild birds found a refuge from the hunter and the natural destroyer of their species.

Several years ago the Billopp property was purchased by the late General Lloyd Aspinwall; but, strange to say, that eccentric gentleman would not allow the execution of the deed until the crumbling bones—many of which had lain there for over a century—were exhumed and removed off the premises.

Mr. Frederick W. Kost, Staten Island's very clever artist, has done much to preserve the original scenery of this famous old grave-yard, and has placed upon canvas a picture that may tell us how the "first homestead grave-yard on Staten Island," (of which we have any authentic history,) looked in days of yore. Mr. Kost has also executed an excellent painting of the Old Billopp House. Both of these paintings, I have pleasure in saying, are in my possession, having been presented by the friendly artist.

In partially changing the subject, it seems to me not inappropriate to accuse this Association of a certain amount of negligence in failing to show its interest in the historical landmarks of the Island, many of which will be lost and forgotten unless marked by the present generation.

Take, for instance, the Aquehonga burying-ground at West Brighton. I venture to say that not more than one in a hundred of the people of Staten Island to-day can locate it. And the same may be truthfully said of the old Billopp family burying-ground. There should be some sign, bearing a description of the spot, wherever and whatever it may be.

I have met with native, gray-haired citizens of Staten Island who could not even tell me where the old British fort (back of Richmond) is located.

There is nothing to tell where the first County Court House stood, although it is known to a few to have been located about two hundred yards south of the old Black Horse Tavern. There is nothing to tell where the "Rose and Crown"

furnished a headquarters for Howe, Clinton, Knyphausen, Andre, and a host of other "royal" dignitaries.

There is nothing in the half-deserted village of Richmond to designate the spot where the British burned the home of God, because, they said, it was a "rebel church," or the old inn in which Simcoe plotted to murder and rob, and Major Andre wrote his will, and where the Battle of Long Island was planned. There is no mark on the Old Red Jail to tell that it held the county's prisoners as far back as 1710; nothing to tell the eventful history of St. Andrew's Church.

There is not a stone, not a word, to mark the spot at Stony Brook, and tell those who pass that there stood the first church erected on Staten Island, and that there is where, more than three centuries ago, the brave pioneers of American civilization laid their dead.

There is nothing to tell that on the heights of Fort Wadsworth was established the first signal station in North America; nothing to tell how the sturdy Dutchmen in those far-away days, amid constant danger and death, there viewed the ever-beautiful Narrows and the enchanting scenery far beyond.

There is nothing to tell of the chain of signal stations on the Island, established by the British. One was at Richmond, one at the spot near the light house on Richmond Hill, one at the high point near the junction of Todt Hill road and Ocean terrace, one on Fort Hill, one near the Elm Tree Light, and one near the iron ore mines.

There is nothing to tell that rude prison-pens stood at Richmond, wherein hundreds of starving patriots suffered and died.

There is nothing to tell that the famous Tory General Skinner died at the hand of Lord Sterling in the cove near where the Athletic Club House now stands, and that his lifeless form lay in the hallway of the old Pelton House until a military escort came from Clinton's army at New Dorp, and carried them away for burial at Perth Amboy.

where the Skinner homestead was located.

There is nothing to tell the story of the battle that was fought at Richmond between a brigade of "Ragged Continentals" and a similar force of British regulars; nothing to tell of the retreat and escape of the Continentals to Marshland (Green Ridge) and across the Kills.

Indeed, there are scores of neglected historical spots on Staten Island which it is somebody's duty to mark. Little or no attention seems to have been given to the subject. It would be interesting to strangers visiting our Island to know something about its history, and it would educate our people and make them familiar with the details of local affairs in the long ago.

For instance, something might be placed upon the Old Billopp House in this manner: "The Manor of Bentley, built in 1688; home of four generations of Billopps; scene of the interview between Lord Howe and John Adams, Benjamin Franklin and Edward Rutledge; confiscated by the Government at the close of the Revolution." Or, in the case of

another important historical relic: "The First Moravian Church on Staten Island; set on fire by British soldiers and partially destroyed." Or, still another: "Spot where the first County Court House stood, erected in 1682; abandoned in 1727; last of foundation demolished about 1825."

Under the existing circumstances it seems to be nothing short of a sacred duty for this Association to consider this subject well; consider it now; consider it until something is accomplished.

The position of Staten Island in the social and commercial world to-day is of such importance as to make every one who takes an interest in its welfare feel proud. Staten Island is forging ahead as it has never done before. It has reached that progressive position which will not permit it to stand still, much less to go backward.

Therefore, this association should keep pace with the busy times in which we "live, move and have our being," and slight not a fraction of the work which seems to have been ordained for our hands to do.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

January 14th, 1893.

Meeting called to order at 8.45 o'clock, at the residence of Mr. Jos. C. Thompson.

The committee on World's Fair reported that a selection of about fifty objects had been made, from the Indian and Revolutionary relics in the collection of the Association, for the Richmond County Loan Exhibit. Several members also stated that they had agreed to loan such parts of their individual collections of Staten Island objects as might be desired by the Loan Committee.

The amendment of the Constitution, consolidating the offices of Recording and Corresponding Secretary into one office, to be known as that of Secretary, was adopted.

An election for Secretary and Curator resulted in the election of Arthur Hollick as secretary and Joseph C. Thompson as curator.

On motion, the president appointed Mr. Wm. T. Davis to attend monthly to the mailing etc. of the Proceedings, and Mr. Joseph C. Thompson as editor of the current issue.

Mr. Walter C. Kerr referred to the paper on local landmarks, by Mr. Ira K. Morris, published as Special No. 13 last month, and urged that the Association take some definite steps toward identifying and marking historical landmarks on the Island. On motion, Mr. Kerr and Mr. Morris were authorized to act as a committee on the subject, with power.

Mr. Arthur Hollick called attention to the probability that the proposed extension to the Rapid Transit Railroad at Arrochar would result in exposing interesting strata, possibly uncovering cretaceous deposits, as indicated by the fossils

previously found there on the surface. [See Proceedings Jan. 9th, 1892.] In this connection a letter was read from the secretary of the railroad company, offering facility for watching the excavations while work is in progress.

Mr. Hollick also referred to the vigorous manner in which the act for the protection of song and wild birds was being enforced on the Island and stated that the Association should feel well satisfied with the part it had taken in perfecting the law and preventing mischievous amendments to it. In this connection the following memorandum from Justice Augustus Acker, of New Brighton, was read, showing the persons arrested and the fines imposed by him during the month of October:

Oct. 22, 1892. Albert Cards, 9 robins.....	\$45 00
Oct. 22 1892. Joseph Cards, 4 robins.....	20 00
Oct. 25, 1892. Rev. Thos. Dixon, 31 birds...	155 00
Oct. 27, 1892. Henry Engelke, 32 birds.....	160 00
	\$380 00

Mr. William T. Davis read the following paper, illustrated by the specimens mentioned.

There have been sixty-nine species of butterflies taken on the Island up to date, which number does not include the numerous named varieties. The species not heretofore mentioned in these proceedings, are the following:

Argynnis aphrodite, Fabr.

Vanessa milberti, Gdt. Taken near Silver Lake, by Mr. Gustav Beyer, in October, 1886.

Libythea bachmanni, Kirtt. Several of these butterflies were observed on August 11th, 1888, near the *Celtis* trees growing about the old British fort on Richmond hill. The caterpillars feed upon this tree.

Thecla irus, Godt. One specimen taken on May 16th, 1886, at Watchogue.

Callidryas eubule, L. Taken on Sept. 20th, 1891, and again on Sept. 18th, 1892. On this latter date, Mr. Leng and I observed a number in the Moravian cemetery. Mr. Joseph Thompson also reports it from Clifton.

Pamphila leonardus, Harr. Taken on Sept. 25th, 1887, at Mariners' Harbor, and on Sept. 22d, 1888, on Todt Hill.

Nisoniades persius, Scudd. Watchogue and Todt Hill in May and June.

Eudamus bathyllus, S. & A. June and July.

To the above may be added the following notes on species previously reported. In October, 1891, a specimen of *Grapta j-album* was discovered perched on a gas fixture in a bed room. This was certainly a novel place to collect a butterfly which is not common on the Island, only five or six having been reported since 1884. A second example of *Papilio ajax* was seen on June 30th, 1889, near the R. R. trestle at Mariners' Harbor. It came within a yard of me, so its identification is certain. A few *Terias nicippe* butterflies appeared on the Island in 1891, the first since the abundant visitation of 1880. *Pamphila massasoit* originally reported from two specimens captured near the Mill road, New Dorp, was found to be very numerous in the swamp about the pond at Bull's Head in July, 1891.

Mr. Joseph C. Thompson read the following note on a bacteriological examination of the Crystal Water Company's water.

One count was made from a sample taken on January 7th, from the hydrant in Clifton, at the corner of New York avenue and Cliff street. Temperature of

water 37°. The average number of individual bacteria counted to the cubic centimetre was 44.

Another from the hydrant at Clifton station. Temperature of water 36°, with an average of 58 to the cubic centimetre.

The mode of counting is very simple; the water from a hydrant is allowed to run for about five minutes, then a bottle that has been previously sterilized is placed under the stream, the stopper taken out under water so as to prevent any possible contamination from the air, the bottle is then wrapped in tin foil and put in a tight metal box and not opened until the laboratory is reached.

There one cubic centimeter is mixed with about thirty cubic centimeters of nutrient gelatin and the whole poured on a glass plate and put in a warm closet to develop.

To insure accuracy two or three of these plates are made from a sample and the average taken.

In the course of three or four days they are taken out and the number of colonies that have grown represent the number of bacteria per cubic centimeter in the water.

For as soon as the germs are put under the favorable environment of a warm place in which to grow and nutrient gelatin to grow upon, they immediately proceed to propagate at a great rate, so that an individual one twenty-five thousandth of an inch long will have given rise to sufficient offspring to cover a space as big as a five cent piece.

No one could pass a judgement on the purity of the water from but two counts, but I will add that New York city Croton water contains about 12,000 bacteria per cubic centimeter.

Adjourned at 11 P.M.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

February 18th, 1893.

Meeting called to order at 8.15 o'clock, at the residence of Mr. Arthur Hollick, New Brighton. The president in the chair.

The Committee on World's Fair reported that a selection of about eighty objects, representing Indian and revolutionary relics from the collection of the Association, had been labeled and placed on exhibition at the recent loan exhibit at the Hotel Castleton, together with a complete file of the Proceedings for reference. Attention was also called to the gratifying manner in which the selection had been noticed by the New York and local press.

A series of twenty photographs of Staten Island trees were shown by Dr. N. L. Britton—duplicates of the set taken by Mr. Romeyn B. Hough, for the State Forestry exhibit at the Columbian Exposition, as mentioned at the meeting of October 15th, 1892.

The complete list is as follows:

Acer rubrum, L., Red Maple, Garretsons.

Prunus avium, L., Common Cherry, New Dorp.

Liquidambar styraciflua, L., Sweet Gum, New Dorp.

Viburnum prunifolium, L., Nanny Berry, New Dorp.

Fraxinus viridis, Michx. f., Green Ash, Clifton.

Fraxinus pubescens, Lam., Red Ash, Richmond.

Sassafras officinale, Nees., Sassafras, New Dorp.

Platanus occidentalis, L., Sycamore, New Dorp.

Juglans nigra, L., Black Walnut, New Dorp.

Hicoria microcarpa, (Nutt.), Britton, Small-fruit Hickory, Richmond.

Hicoria alba, (L.), Britton, Mocker Nut, Garretsons.

Quercus palustris, Du Roi, Swamp Oak, Oakwood.

Quercus tinctoria, Bartr., Yellow Oak, Richmond.

Quercus bicolor, Willd., Swamp White Oak, Giffords.

Betula lenta, L., Black Birch, Grassmere.

Alnus glutinosa, Willd., Sticky Alder, Egbertville.

Salix alba, L., White Willow, New Dorp.

Populus heterophylla, L., Downy Poplar, New Dorp.

Pinus echinata, Mill., Yellow Pine, Giffords.

Juniperus Virginiana, L., Red Cedar, New Dorp.

Mr. Joseph C. Thompson stated that since the last meeting he had made another bacteriological examination of the Crystal Water Company's water, from a sample taken from a hydrant at the corner of New York avenue and Cliff street, and found 185 individual bacteria per cubic centimetre. The temperature of the water was 34 deg. Far. As previously stated, the New York city croton water contains about 12,000 per cubic centimetre.

Mr. Arthur Hollick presented a piece of ferruginous sandstone, containing impressions of dicotyledonous leaves. The specimen resembles those found in the Drift, at Tottenville and Princes Bay, which are known to be derived from the Cretaceous clays. The specimen in question, however, was found as a Drift rock on the Serpentine hills, to the north of the Cretaceous area. It is possible that it may have been brought to the place where it was found by human agency, but if not its occurrence there is more or less of a problem which future discoveries may solve. It is desired at present merely to place the fact upon record.

A communication was read from Mr. Ira K. Morris, requesting the following corrections to be noted in his paper on Local Landmarks, (Special No. 13, December, 1892.): For "Manor of Bentley, built in 1688," read "1668," and "first County Court House, * * * erected in 1682," read "1683".

The president appointed Mr. Thos. Craig to edit the current issue of the proceedings.

Adjournment at 9.30 o'clock.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

March 18th, 1893.

Meeting called to order at 8.15 o'clock, at the residence of Mr. Thos. Craig, New Brighton.

Messrs. Vasa E. Stolbrand and Martin Gay were elected active members.

The secretary presented a sample copy of the completed index to Vol. II, of the Proceedings and stated that copies would be distributed with the current issue.

Mr. Wm. T. Davis exhibited specimens of the Leopard Moth and read the following communication:

On the 23rd of June, 1888, I found on the sidewalk, under a partly decayed white maple on Fort Hill, a large white and black moth that was rendered helpless by having one of its fore wings broken in two. It was not until last year, when Col. Nicholas Pike's article and accompanying figures on the ravages of the Leopard Moth—*Zeuzera æsculi*, (Linn.)—in Brooklyn, appeared in "Insect Life," that the moth found by me was proved to be the same species from Staten Island. Col. Pike found in 1889 that it had bored nearly all of the trees, mostly maples, from Carlton avenue to the entrance of the park, and that in 1891 it had extended its ravages throughout the city. He also mentioned it as having appeared in Astoria, New Rochelle, Jamacia, New Lots and Flatbush.

In August, 1887, Mr. J. B. Engelman took three specimens of the Leopard Moth in Newark, N. J., and in 1888 many more were found. Previous to this the very rare occurrence of the moths in this country had been credited to the importation of wood containing the larvæ. In 1889, Mr. Beutenmuller men-

tions it as having been found not uncommonly in Central Park. From these facts it will be seen that this destructive insect from the Old World has become quite generally distributed in this vicinity.

Mr. Davis also read the following note:

With Messrs Kerr and Leng, on the 26th of last February, I observed about twenty five Snow Buntings—*Plectrophenax nivalis*, (Linn.)—in a field on Todt Hill, near the highest point of the island. They were feeding in the few places where there was no snow, and flew occasionally in a remarkably compact flock, from one to another of these isolated spots. This bird has not been reported on the Island for a number of years and its present occurrence is undoubtedly due to the severity of the winter.

Mr. J. H. Bowles, in "Science," for January 13th, 1893, comments upon the abundance of the Pine Grosbeak—*Pinicola enucleator*, (Linn.)—and the scarcity of the Snow Bunting about Ponkapoag, in eastern Mass., and gives as a cause the unusually cold weather. The Grosbeaks and the Buntings have each ranged further south than for several years past. Though the weather has been severe, robins have been seen sparingly on the island during every month of the winter.

Mr. Arthur Hollick remarked that the last time he remembered seeing the snow buntings in abundance in this vicinity was during the winter of 1872-73, when they appeared in great flocks, accompanied by the Horned Lark—*Otocoris alpestris*, (Linn.) That winter they were particularly numerous on Fort Hill, New Brighton, during many days in December and January, and large numbers were killed by gunners.

Mr. Walter C. Kerr exhibited, under the microscope, leaves of *Quercus nigra* L., *Q. ilicifolia*, Wang., and *Q. Brittoni*, Davis, and read the following paper in connection with them:

In describing the new hybrid, *Quercus Brittoni*, in our Proceedings for September 10th, 1892, Mr. Davis refers to the pubescence of the under surface of its leaves being intermediate between that of *Q. ilicifolia* and *Q. nigra*. This observation was made from casual inspection, without reference to the exact nature of the pubescence. Under the microscope it will be seen, as in specimens submitted, that the *Q. ilicifolia* has so dense a pubescence that the epidermis is completely hidden, while in *Q. nigra* the tufts are quite separated, even isolated. In *Q. Brittoni*, the hybrid between these species, the intermediate character of the pubescence is most striking; the under surface of the leaves being starred at regular intervals by the tufts, which are usually sufficiently close to allow their spreading hairs to touch one another. These tufts seem to be composed of six to twelve hairs spreading from a common base and occupying a space about .15 to .2 m m. in diameter.

An average specimen contains about sixteen tufts per square m m., while in an other, representing the strongest pubescence which the hybrid seems to attain, about twice this number were present and somewhat smaller in size, indicating considerable variation in these appendages.

The wide difference in pubescence of *ilicifolia* and *nigra*, however, is such that a variation of even one hundred per cent. between different specimens of *Q. Brittoni* is not sufficient to materially affect the distinctiveness of this characteristic.

Dr. N. L. Britton exhibited a collection of about 75 Staten Island lichens and stated that these represented the beginning of what was hoped would be a complete collection, which would form the basis of a local list similar to the other lists of objects already published by the Association.

Mr. Arthur Hollick called attention to the fact that an earthquake shock had been experienced on the island shortly after midnight on March 8th, which had been sufficiently severe to awaken many people, especially those who resided on the hills in New Brighton, but that it did not seem to have been felt generally throughout the rest of the Island.

Mr. Jos. C. Thompson stated that he found, on South Beach, a dead specimen of the Tom-Cod, (*Gadus tomcodus*), about 8 inches long, which had made a meal of eight mud-killies (*Meloneura limi*). Those that were in the foremost part of the stomach were quite perfect, while the others that were further down had begun to be dissolved by the digestive fluids.

The president designated Mr. Arthur Hollick to edit the current proceedings. Adjournment at 10 o'clock.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

April 8th, 1893.

Meeting called to order at 8.30 o'clock at the residence of Mr. William T. Davis, New Brighton. The president in the chair.

Mr. George Dupuy was elected an active member.

Mr. Arthur Hollick exhibited specimens of Indian rubbing stones and read the following paper concerning them:

INDIAN RUBBING OR POLISHING STONES.

Since our last meeting, while on a tramp across the Island from Pleasant Plains to Rossville, I was struck by the fact that the shell heaps, which have been noticed in that region at different times, form practically a continuous chain or trail from shore to shore. They follow the course of Sandy Brook up to Woodrow road and from thence may be found in nearly every field or piece of cleared ground until we reach the village of Rossville. Indian implements of various kinds, with fragments of pottery have been picked up at many points and are likely to be met with in any part of the region. The distance of some of these accumulations from the shore, their elevation above the water, and the fact that in many places they are spread thinly and evenly on the surface has led me to think that the more distant ones from the salt water may have been carried there in recent times by the farmers for purposes of fertilization, as is frequently done. Whether this be so or not, implements may be found where ever the shells occur, proving their origin indisputably.

Amongst a number of relics found at the time mentioned was an unusually

fine specimen of a rubbing or polishing stone—an implement of which few have turned up on Staten Island and in regard to which I believe, the attention of the Association has never been called. Amongst the hundreds of implements which our members have collected during the past ten or twelve years from all parts of the Island I find but seven which can be classed in this category—all, with the exception of this one, from Tottenville. All of ours consist of either hard quartzite or trap and have evidently been used for purposes of grinding and polishing. In C. C. Abbot's "Primitive Industry" there is a chapter devoted to the subject of hand-hammers and rubbing stones, in which he remarks upon the apparent rarity of these latter implements and he suggests that they have probably been overlooked by collectors. This seems to be quite probable, as they are likely to be passed for ordinary cobble stones, or worn fragments of rock, unless special attention happened to be called to them. In our specimens it may be observed that some of the rounded ones have been worn to smooth level faces, evidently in polishing or grinding more or less plane surfaces, such as the blades of axes or celts, while others have evidently been selected on account of their angular shapes, and bear evidence of having been used on the angles, probably for purposes of grooving. It is more than likely, as Dr. Abbott intimates, that the rarity of these implements is more apparent than real and now that attention has been called to them we may expect that other specimens will turn up.

During the examination and discussion

of these relics, Mr. William T. Davis exhibited an Indian mortar, found near Sandy Brook. Mr. Jos. C. Thompson presented an old bayonet, found while excavating on the Richmond road near New Dorp.

Mr. William T. Davis presented nine plants, new or rare to the flora of the Island, with the following memoranda:

BOTANICAL NOTES.

Rubus odoratus, L. Side of Todt Hill road near the highest point. Spreading from introduced plants.

Aethusa cynapium, L. Abundant in a field corner Crescent and Jersey streets, New Brighton. Previously reported only from Clove Lake swamp.

Oxycoccus macrocarpus, Pers. Near Sprague avenue, Tottenville, and accompanied by the "Cotton grass" (*Eriophorum*) as in the swamp near Richmond village.

Vaccinium Pennsylvanicum, Lam. Watchogue and Arlington.

Stachys palustris, L. var. *cordata*. Abundant in field near Eltingville station.

Pinus mitis, Michx. Abundant at Linoleumville.

Habenaria blephariglotis, Hook. Sparingly at Watchogue along Merrill's road.

Calopogon pulchellus, R. Br. Merrill's road near trap ridge. Collected by Mr. C. W. Leng.

Smilacina stellata, Desf. Borders of salt meadow at Great Kills.

Mr. Walter C. Kerr exhibited a large fragment from the broken trunk of a horse chestnut tree, showing profuse budding and read the following paper:

Some features surrounding the adventitious budding of a horse chestnut, *Aesculus hippocastanum*, L., on Tompkinsville Hill may be worthy of passing notice. On the bleak eastern brow of the hill there stands, among the few scattered trees remaining, a horse chestnut about 18 inches in diameter, branching about three feet from the ground into two trunks each about ten inches in diameter. The trunk leaning to the eastward is thriving and about the normal height for

its diameter. The one leaning to the westward has broken off, with an irregular splintery fracture about five feet from the ground, perhaps on account of its lesser resistance to our easterly gales, and the stump has rotted badly. The bark however retains its vigor and from the cambium layer, where exposed along the irregular edges of the ruptured section, adventitious buds have sprouted profusely. They are also found where the bark has split, and in the crotch where the tree has forked, where the bark of the two trunks unites. Some of the thickest colonies of buds were at the apex of the splintered stump, and I therefore sawed off about fifteen inches with its buds and three young shoots which have seemed fortunate enough to grow to the length of some eight inches. It will be noted that the bark is in a good state of preservation, the inner layers alive, while the wood is not only dead, but far gone in decay. The thickest cluster of buds is eight inches long by 1½ inches wide, and within this space I have counted 200, about 30 of which are alive, the others being mostly the remains of a previous crop. There is no evidence of accidental destruction of the buds, though a few small shoots may have been cut off. Cows would scarcely browse on them, and one cluster occupied an inaccessible position in the fork.

One is not surprised at the dense growth of shoots which rise from adventitious buds on a decapitated willow or the spraying branches of elm which are of similar origin, but I have never before noticed so profuse a crop of buds whose mission seems to be entirely futile. They seem to represent an especially vigorous effort of the broken organism to survive, and under the circumstances this effort might be very persistent because of the opportunity afforded the unfortunate trunk, deprived of means of assimilation, to draw on the sister trunk, fully developed, for the requisite nourishment. It therefore might seem to have more opportunity to thus maintain its life than had it been a single trunk snapped off

and dependent only on the residual nourishment within its roots. This supposition is in some degree supported by the fact that this particular tree stands on a hill some 300 feet high, rooted in the thin dry soil covering a barren serpentine ledge, and hence would scarcely be expected to show a vigor which compares favorably with the sprouting of the adventitious shoots of the brookside willow. The specimen from the stump shows only three small surviving shoots, and may it not be fairly surmised that if the budding effort of the cambium layer of this old stump could have been concentrated into a few buds and their resultant shoots, the struggle for existence would have been more successful. It would

seem, even in the absence of positive evidence, as though the prolificness with which the buds were formed seriously retarded the survival of any, and thus the ability of the cambium layer of this stump to restore the interrupted growth was handicapped by the opportunity afforded for abnormal budding effort through the supply of nourishment obtainable from the uninjured half.

Mr. George Dupuy exhibited a series of about 400 drawings representing Staten Island pond life—diatoms, desmids, algae and infusoria—all drawn to scale on cards, handsomely colored and arranged.

The president volunteered to edit the current proceedings.

Adjournment at 10.45 o'clock.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

May 13th, 1893.

Meeting called to order at 8.30 o'clock, at the residence of Mr. Walter C. Kerr, New Brighton.

The resignation of Mr. A. H. Burdick was read and accepted.

Messrs. Henry L. Twiggs, Seaside S., I. and George H. Pepper, Tottenville, S., I. were elected active members.

Mr. Ira K. Morris referred to the sketch of the life of the late Timothy Green Benham, published in the Proceedings of the Association for April 11th, 1891, and offered the following resolution, which was adopted:

Resolved, That a committee of three be appointed, with power, by this Association, to take in charge the matter of procuring a monument to be placed over Commander Benham's grave, at the earliest possible opportunity.

The president appointed Messrs. Ira K. Morris, Arthur Hollick and William T. Davis as such committee.

Mr. Arthur Hollick reported that since the last meeting he had completed the collecting and shipping of specimens from Staten Island for the New York State mineral exhibit at the World's Fair. In addition to the fire clays, sands and kaolins from the Kreischerville clay district, as noted in the Proceedings of December 17th, 1892, there had been since added specimens of building brick clay, from McCabe's pits at Green Ridge; building sand, from the Drift deposits worked by Mr. Silas N. Havens in New Brighton; yellow gravel, used as a binding material for the road metal on our county roads, from Todt Hill, and a ten inch cube of trap rock from the Graniteville quarries.

Mr. George H. Pepper referred to the

shell heaps, implements and other evidences of Indian occupation so abundant in the vicinity of Tottenville, which have been the subject of communications and memoranda before the Association from time to time, and read the following paper upon Indian graves in that locality:

One of the first land patents granted on the island was the 1,163 acres of land presented to Christopher Billopp, by the Duke of York, known as the Manor of Bentley. A portion of this property, overlooking Raritan Bay, was purchased by Mr. Joel Cole, who, in the spring of 1858, broke ground for the erection of a house. During the digging of the cellar the workmen unearthed a skeleton and also a number of skulls, one of which was taken by Mr. James L. Bedell, a carpenter, and the rest were either destroyed or else carried off by the town's folk, who flocked to the spot to view the remains.

The skeleton was found in a sitting posture and near it were found a number of implements. All that was preserved of this skeleton was the skull which Mr. Bedell took, and which he kept in his possession until it succumbed to the ravages of the atmosphere and crumbled away.

Five years later, in the spring of 1863, Mr. Cole decided to put an addition to his house, and he accordingly hired men to put his plans into execution. Isaac Bedell, Augustus Zealous and Charles Drake started to dig the cellar, which was to be sixteen feet square. Bedell, who was at work at one corner, had not been digging long when his shovel struck something which emitted a hollow sound. He at once commenced removing the

earth and on reaching the object it proved to be a human skull lying face downward. They at once commenced a search for the balance of the skeleton, but the only parts found were the arms, which were extended above the head. They continued digging and before the cellar was completed more than twenty skulls were unearthed. They were found at a depth of from three to four feet, and the majority of them were very much decayed, some even falling apart on coming in contact with the atmosphere. A few arm and leg bones were found intact, otherwise the skeletons had entirely wasted away.

The first cranium (the one found by Mr. Bedell) proved to be the finest of all, being well preserved and having both the superior and inferior maxillaries in perfect condition. This skull was carefully wrapped in shavings by Bedell and placed under a barn where it was found by a gentleman by the name of Chippendale, who gave it to Mr. Edward Robadee, then a boy of nine. He sold it for three dollars to Dr. Eber W. Hubbard, a naturalist living in the village. Dr. Hubbard had not had the skull in his possession long before it began to crumble, and in a short time it was entirely devoid of its former rotundity. Unfortunately, no measurements were taken of this skull, or at least, if they were ever taken, no record of them can be found. From the position in which the remains were found, all who saw them were led to believe that they must have been buried in a heap and in a hurried manner, and the question naturally arises, why were they so buried? It is surely contrary to the customs of the aboriginal tribes to bury their dead in such a manner. The principal skeleton, the one found when the main house was built, was, as before mentioned, in a sitting posture and surrounded with implements of the chase, and also near it was found a large slab of mica. From the position of this skeleton and also from the accompanying implements it would seem likely that it was a chief and that great care had been taken in burying

him, although his body was found within a few yards of what may be called the heap. Probably the slab of mica had some significance.

About six hundred feet from the spot just mentioned is the Appleby estate, a low-lying strip of land facing the bay, which also belonged to the old Billopp grant. Samuel Gibbs, Alfred Reid and Richard Robadee were digging a cistern on this estate, and had reached a depth of about three and a half feet when Robadee unearthed a skull and further digging brought to light the whole skeleton. The skull was in good condition but the bones of the body crumbled on being handled.

The skull was left on the property and probably crumbled, as did those taken from the Cole estate, after it had been above ground a short time. This skeleton, unlike the others, was found in a standing position—a mark of respect shown only to a great chief—and was surrounded with the usual amount of implements, but of a superior class.

Mr. Arthur Hollick stated that a number of the implements found in the graves mentioned by Mr. Pepper came into his possession many years ago, and that among them were several which could not be duplicated for fine workmanship by any of the hundreds subsequently found in the region. Mr. Hollick also called attention to the large stone axe, one of the same lot of implements purchased from Mr. Joel Cole, Jr., by the Association, and described in the Proceedings of September 12th, 1885.

Mr. Ira K. Morris read the following paper upon the Old Britton House:

A few hundred yards north of the Oakwood railroad station, on the Amboy road, may be seen the crumbling ruins of one of the oldest houses on Staten Island. It was built in 1680—two years before the County of Richmond (the fourth in the State) was organized—and it was occupied up to within two or three years ago.

This old house—of which there is nothing left but portions of its thick, crumbling walls—played its part in the dramas and tragedies of the Island's

early civilization. Its builder was one of the persecuted Huguenots, who sought protection of life and liberty of conscience even amid the wilds of savage Indians and the haunts of animals.

The house was built in strictly Holland style of architecture, of stone, with long sloping roof, one story and attic and basement

At the time of the building of the first Richmond County Court House at Stony Brook, in 1683, the "Britton house" (as it was afterwards called) was one of the nearest dwellings to that institution—probably a quarter of a mile distant. The Court House itself contained but two small rooms—the sheriff's "quarters" and the county "goal"—consequently, the county court was held in public hotels (or taverns, as they were then called) and also in private residences of officials of the court.

I have accounts of "publick tryalls" of "ye offenders against ye publick peace of his mag'sty's domayns" which were held in the old Britton house about two centuries ago.

One states that "Isaac Von Flechton had fayl'd to sattisfie his magisty's clayme for rente of ye meddowe land adjoining ye Guyon grante." And "ye order of ye Court of his majistie" was "that ye sayd Isaac Von Flechon be directed to paye unto ye sayd Co't two (2) Bushells of ffresh wheate in additionall to the original clayme for rente of ye sayd meddowe land. And ye sayd Isaac Von Flechton will, by order of his majesty's Co't, be thrown into ye Rich-Rond County goal, at Stony Brook, by ye sheriffe of ye sayd county, and there be held as a common prisoner of cryme ag'inst ye sayd laws of his magisty's domayns until ye sayd debt is pay'd."

An Indian who had become crazed with "fire water" and having committed an assault upon a Dutch settler, named Hans Woolstonsen, was also tried for his offense in the Britton house. Several members of his tribe awaited in ambush, a short distance from the house and plotted to kill all the white men con-

nected with the court, provided they attempted to punish the prisoner.

According to tradition, one of the tribe, who was friendly with the judge, managed to give him the information, and a company of Island soldiers was called out for protection. The Indian was convicted and imprisoned in the county "goal" at Stony Brook. After serving out his sentence he, with others, repaired to the old house and attempted to destroy it with the torch. One of the number was shot and the others became frightened and fled.

There is a mystic tradition that the old Britton house was the first Waldensian parsonage, and was connected with the first church erected on Staten Island.

From manuscripts, written during the French and Indian war, it would appear that this was the scene of the massacre, by Aquehonga Indians, of an English family, consisting of husband, wife and several children. No one was punished, because the murderers were defended by the French, who at that time were in deadly conflict with the English.

During the Revolution the family living in the old house were driven out by British soldiers. A cavalry outpost was maintained in this neighborhood and, as it is well known that the Hessians were utilized for that purpose on Staten Island, it is safe to assume that Colonel Brockholst, commander of the only mounted Hessian regiment at that period of the war, used this house as his headquarters.

It was afterward used as a British hospital for contagious diseases, the small-pox raging among the soldiers at Richmond village, during the winter of 1777. By what system of fumigation it was made habitable again is not known. Yet it appears to have had occupants again before the close of the war, as a squad of ever-present, plundering Hessians attempted, by the aid of tricky Tories, to lynch an old man, named Cornelius Varnum, residing there, because they thought him to be in sympathy with George Washington. How the old man managed to escape is not known.

The old house has its pretty "love story," too. It is said that when the British evacuated New York there was a sad heart left within those great stone walls, "to wait for years, perhaps for ever."

As the story "goes," the girl went to the highest point in the neighborhood and watched, with tear-dimmed eyes, the great fleet of ships slowly move out from land, and when the last speck had died away on the ocean's horizon, she returned to her home to pray for her lover that might be going from her never to return.

Years, however, dragged their slow way along, and one day there was a happy re-union in the old stone house. The British grenadier had forsaken his country, his home, his title and all, to come back to the girl he loved.

They were married in the old Britton house, and the adopted American, who then and there became the husband of the faithful girl, afterward became one of the most prominent citizens of Richmond County. Their sons and daughters helped to make our local history. Their grand-children have been well known in the walks of life, and their great-grand-children are to-day prominent in the social and business circles of Staten Island.

One of these, a highly esteemed lady, residing on the North Shore, narrated this little romance of her ancestors to

the writer a few years ago.

The old house has witnessed many changes and vicissitudes. For two or three generations it has been familiarly known as the "Old Britton House." Like other structures of its class on Staten Island, there seems to have been little care taken to preserve it. The loose stone, the crumbling brick, and the mouldering window frame were, doubtless, never repaired or in any manner checked from going on their road to decay.

It is several years since it was considered a respectable or even comfortable abiding place. Each storm made its cruel inroad into the roof and walls.

At last it was vacated by its owner, and then, with its walls propped, its moss-covered roof patched with boards and sheets of rusty tin, it became a hovel wherein clustered a crowd of otherwise homeless negroes.

Finally the props gave way, the roof fell in, and the poor negroes were driven to seek shelter somewhere else. Then the walls began to tumble down—one great stone after another rolling to the ground—until a mass of ruins now marks the spot where so many stirring events transpired in the long ago.

The president designated Mr. Georges Dupuy to edit the current issue of the Proceedings.

Adjournment at 10.30 o'clock.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION OF STATEN ISLAND.

June 10th, 1893.

Meeting called to order at 9 o'clock at the residence of Mr. Thomas Craig, Vine street, New Brighton.

In the absence of the president and secretary, Mr. Craig was elected chairman and Mr. Wm. T. Davis secretary, *pro tem*.

Mr. Mark Samuels, Rosebank, S. I., was elected an active member.

Mr. Ira K. Morris stated that he desired that Mr. Walter C. Kerr, President of the Association, be added to the Benham Monument Committee, and should act as chairman of the same. Mr. Morris made a motion to that effect and it was adopted unanimously.

Mr. Wm. T. Davis exhibited specimens of *Iva frutescens* and read the following paper upon

THE INFLUENCE OF THE PAST WINTER ON THE HIGH-WATER SHRUB.

An examination of the High-Water Shrubs, (*Iva frutescens*), during the past few days, has disclosed an interesting fact, which is no doubt entirely due to the severe weather of the past winter. A glance along the meadow creeks show, as yet, but a gray line of bushes with numerous short sprouts starting either at their roots or a few inches above them on last year's wood. On the 7th of May, 1892, while observing the sea-side finches, the High-Water Shrubs were noticed to be coming into leaf midway up the stems, and by the middle of May it was difficult to secure a good view of the finches owing to the number of leaves. This year there would be no difficulty, for even at this date they are as bare as in winter, having retained their vitality for

only five or six inches above the ground. Some of the dead *Iva* stems show evidence of being three or four years old, so there is this proof also that the past winter has been the hardest one for the species during at least that length of time.

Mr. Davis also read the following:

LOCAL NOTES UPON THE OPOSSUM AND RED FOX.

The opossum visitation, which was commented upon in these Proceedings for March 12th, 1892, has in no wise abated, and during the past year quite a number were killed on the island.

No less than fourteen opossums have been taken at Watchogue and the neighboring hamlets within a short period. It was thought by the residents, that they were possibly imported on the railroad, as the completion of the bridge and the appearance of the opossums were so nearly coincident. However, the causes given in the Proceedings referred to above, are probably the correct ones. In the winter of 1891-92, a dog owned by Mr. George Marsac, who lives at Watchogue, caught two opossums, one of them under the piazza floor. This past winter, Mr. Marsac and Mr. John De Bau found four opossums in a hollow gum tree; Mr. George Decker and Mr. Marsac caught two others, and Mr. Orville Merrill, one; Mr. George Merrill, one; Mr. Smith one in his cellar, and Mr. Van Pelt, who lives near Bull's Head, found one in his chicken house. Mr. Drake, of Old Place, heard a disturbance in his chicken house last summer, and discovered, upon investigation, an opossum, which he promptly

killed. On April 30th, 1892, I found a very much decayed opossum in the woods near Watchogue, and even under such circumstances it had the peculiar fatty odor for which the animal is remarkable.

Mr. Gratacap has informed me of an opossum captured on Bement avenue, West New Brighton, and Mr. Galloway, of one killed on the Leonard White place, in Middletown. One was secured on the McAndrew place last winter; one on the Meissner place at Richmond by Mr. Lyle, and one in the Moravian Cemetery by Mr. Albert.

This spring, Mr. Samuel Henshaw showed me a dead opossum under an apple tree near the brook that crosses the Manor road; Mr. Joseph C. Thompson found one near Arrochar, and Mr. Perry Cornell, on the 9th of April, caught a twelve pounder in the old iron ore mines on the slope of Todt Hill.

From the above facts and those presented in the Proceedings of March 12th, 1892, it appears that the opossum has become well established upon our Island, and that thirty-six individuals have been captured during the last four years. Of course, the record can only be considered as partly complete.

In connection with the opossum visitation, it may be well to record a few memoranda concerning the foxes that have been found on the island within the last few years. In 1887 or '88, one was killed by Mr. Cole, who resides on the Amboy road, near Oakwood. It was believed at the time to be the individual, that escaped from the superintendent of the railroad. In July, 1890, the RICHMOND COUNTY STANDARD printed an account of the foxes that had been killed or seen in the vicinity of Richmond. It was believed that the original pair either escaped from the hunters of the Country Club, or from the captain of a canal boat, which had several on board, while discharging his cargo of coal at Richmond creek. The animals destroyed many fowls on the Decker and Latourette farms, and on the former of these places a young fox was trapped the jaws holding him by the toes. In the morning, it

was found that his mother had evidently been busy all night, as his shoulders were lacerated by her efforts to secure his release. Another fox was shot by Mr. Decker, while it was killing a Guinea hen.

Last summer, Mr. Freeman, of Old Place, was on the meadows near his home engaged with some companions in surveying, when they discovered a family of foxes beneath a hay stack. The male ran away upon the approach of danger, but the mother and five young were finally secured.

The following paper, by Mr. Arthur Hollick, in the absence of the writer, was read by title:

NOTES ON THE GEOLOGY OF THE NEW RAILROAD CUT AT ARROCHAR.

In a previous contribution on the Cretaceous formation of Staten Island, (Proc. Nat. Sci. Assn. S. I., Jan. 9, 1892,) I mentioned the discovery of Cretaceous fossils at Arrochar, and called special attention to specimens of *Cardium dumosum*, Conrad, which were found in a seam or stratum of sandy clay, which I was inclined to think might represent the outcrop of more extensive strata not far below. Recent excavations for the new railroad cut in the vicinity led me to hope that the overlying Drift deposits might be penetrated to a sufficient depth to expose these strata, which, from the surface indications, we know can not be very far away. Several visits were made while the work was in progress, but it was not until last week that the excavation was completed and, fortunately for the geologist, the heavy rain of the 6th inst. followed immediately afterwards and washed everything clean in a most gratifying manner, affording unusually favorable conditions for final observation during the past few days. A finer section of Drift material has never been exposed on Staten Island. The sides of the cut are smooth—the rain having merely emphasized the bedding planes without cutting any furrows—and no talus has yet accumulated at the base. At one point a section about 50 feet in height is exposed.

At the base are masses or beds of bluish, semi-plastic and sandy clay, from which extend upward irregular seams and smaller masses, interbedded with fine sands and gravels, in which "flow and plunge" structure is generally well marked. This series of deposits reaches the surface at about where the new Arrochar station is located, and from thence southward are all that is to be seen. The boulder till thins out to a feather edge where the sands and clays come to the surface and gradually becomes thicker northward, until finally it is all that is visible in the cut. The deepest part of the cut shows the entire series from base to summit and gives us a 50 foot section in a N. and S. direction, through the extreme edge of the terminal moraine. Irregular masses of clay, accompanied by water assorted sands and gravels at the base capped by the unassorted boulder till on top. The thickening of the boulder till northward and the position of the underlying material give a general appearance of north to north-westward dip for the entire series.

No positive evidence of any Cretaceous strata in place could be found, but on the other hand a large part of the sands and gravels are manifestly reassorted Cretaceous material. The characteristic ferruginous sand & clay concretions in which most of our Cretaceous fossils have been found are abundant, and the sandy clay stratum in which the *Cardium*s previously mentioned were found, may be traced into the cut, with its accompanying sands and gravels. It can no longer be regarded as an outcrop, as other similar seams or masses are quite prominent, interbedded with the sands and gravels. In some places coarse gravel and clay nodules are so cemented together with limonite that a firm conglomerate is formed. Iron is everywhere abundant. In some hand specimens of the conglomerate may be seen pyrite, magnetite and limonite and spring waters are impregnated with the sulphate. Accumulations of magnetic iron sand may also be seen in places. Yellow Gravel or Pre-Glacial Drift is also, to a limited extent, a con-

stituent of the assorted material.

It is evident that only the upper part of the clay has been reached and this is very much disturbed and crumpled, portions having been torn off from the main mass below, forming the irregular beds or seams associated with the sands and gravels. The indications are that these were all deposited previous to the advent of the glacier which shoved them ahead and finally left them overlapped by the thin edge and flanked on the north by the mass of the boulder till.

The character of the clay is not that of our ordinary boulder clay, which is nearly always colored red from the prevailing constituent—eroded Triassic sandstone and shale. These clays are bluish and the rock from which they were formed is not anywhere in evidence at the present time. The large amount of mica and the occasional fragments of mica schist, hornblende schist and granite which are to be found throughout all the underlying deposits at Arrochar may perhaps be accounted for on the theory of a belt of such rocks to the south and east of the serpentine ridge which has suffered decomposition and erosion and thus formed the source of supply for the bluish clay and micaceous fragments. Such a belt is theoretically present, for we know that it exists to the east of the serpentine at Tompkinsville and St. George. This theory is emphasized by the position of the clay which is beneath and older than the boulder till and would thus have been formed independent of material from the red Triassic area which did not suffer extensive erosion until it had been overridden by the glacier. One lenticular basin of clay in the upper part of the till north of the morainal edge, deserves attention from the fact that the clay there formed is typical reddish boulder clay, horizontally stratified and evidently undisturbed since its deposition, which must have been subsequent to the retreat of the glacier. This was the source from which the erstwhile brick yard at Arrochar obtained its material for the manufacture of building brick. The comparison between this red,

horizontally stratified clay in the till above and the bluish distorted masses beneath is striking.

One feature that will doubtless be noticed at once by everyone who examines the material in the moraine at Arrochar, is the quantity of soapstone and limonite ore contained in it, evidently due to the erosion of the serpentine ridge which near this point was crossed by the glacier.

Summarizing the results of our facts and observations we may picture to ourselves the former coastal plain, consisting of Cretaceous and later deposits, extending to the base of the serpentine ridge, with a belt of schistose or gneissic rocks around its base. On the advent of the glacier, advancing from the northwest these deposits were eroded and pushed ahead by the ice mass and assorted by the torrents which flowed from it, and which, on its retreat, left the deposits of the till, forming a superficial unassorted cap, composed of fragments of rocks from the north, in which the Triassic

sand stones, shales and traps of New Jersey are the most abundant constituents. In the depressions of the till local deposits of gravel, sand and clay would accumulate, colored with the prevailing red from the eroded Triassic rocks.

We can thus understand the reason for the existence of so many undrained pond holes in the hills with their masses of decaying vegetation, which gave to Clifton some years ago, such an unenviable reputation for malaria and general unhealthfulness. With the adoption of systems of drainage and the clearing off of forests these conditions are being rapidly changed and while the natural features will eventually be destroyed the region will be made more available for settlement.

Mr. Ira K. Morris was appointed by the chairman to edit the current Proceedings.

On motion, adjourned at 10 o'clock to meet again on the second Saturday in September.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

September 9th, 1893.

Meeting called to order at 8.30 o'clock at the residence of Mr. Arthur Hollick, New Brighton. The president in the chair.

The following persons were elected active members: John J. Corson, New Springville; John J. Santry, New Brighton; F. W. Skinner, New Brighton; Henry P. Morrison, West New Brighton; Edward M. Muller, New Brighton; David J. Tysen, New Dorp.

The following communication from Mr. Justus O. Woods was read by the secretary:

You will add one more to your public benefactions, if you will persuade the journalists to write "Towd" or "Toude" Hill and not "Todt." I was told at Rochdale by the secretary of the Co-operative Society, that "Toad Lane," was a corruption of "The Old Lane." The Dutch settlers there contract "the old" to "T'owd," thus the old man is "T'owd-man" the old woman "T'owd woman."

You know that that part of Staten Island below the fort was settled by the Dutch and was known as the "Old Town," there is "Old Town Lane." The hill above this place would properly have been called "The Old Town Hill," and contracted would be in Dutch "T'owd Hill." I have seen it spelled in public documents "Toude." It seems to me if the public should understand the origin of the name they would consent to write the name "Towd Hill" or "Touie Hill" and not "Toad" nor "Todt."

The President remarked in connection with the above communication that, as the

government has requested information regarding the proper geographical names along the coast, the secretary communicate with the authorities at Washington, and suggest the change of name from Robbin's Reef to the original Dutch one of Robyn Reef. This name was given to these rocks for the reason that seals used to congregate there; robyn being the Dutch for seal.

Mr. Ira K. Morris read a paper upon "The Old Hotels of Staten Island," which will be printed as a "special."

A paper by Mr. Wm. Olliff on the old ferries of Staten Island was read by title and will also be published as a special.

Mr. Walter C. Kerr called attention to the certainty with which our late August storms have demonstrated that the damage depends chiefly upon the amount of rain accompanying the wind, and presented the following paper:

THE STORMS OF AUG 24th AND 29th.

The havoc wrought upon our vegetation by recent storms, perhaps deserves notice, especially considering the opportunity afforded to compare the effects of two destructive gales, only four days apart. These storms though quite similar in general character differed widely in one feature, whose destructive power might escape general notice or at least be much underrated. This feature is the amount of water in the air which largely augments the weight of the moving column and at high velocities transforms the usually harmless wind into a formidable battering ram.

Some time since Mr. Wm. T. Davis

mentioned that the comparative scarcity of large trees in this vicinity was probably due to our high gales, and when the results of recent storms are viewed, there can be little doubt regarding this cause.

The gale of August 24th is generally credited with having uprooted or broken more trees in this vicinity than any on record. This destruction of vegetation was widespread. In the cities and towns the streets were blocked with fallen trees and branches while the country roads were in many places impassable. Numerous white oak and chestnut trees were uprooted that to all appearances should have offered great resistance. This storm had a comparatively low wind velocity and a great rain fall.

The gale of August 29th did some damage to vegetation, though not nearly so much as that of the 24th. At sea it was one of the worst storms experienced in this latitude for years. It was characterized by a very high wind with little rain.

It may be said that the first storm destroyed the weak trees, leaving little for the second and greater one to wreck. On the other hand it may be presumed that the first storm would cause much weakening and facilitate the efforts of the greater wind that followed.

The first storm had a maximum velocity of 48 miles, reached by our winds about once each month without sensible damage, while the maximum velocity of the second, 60 miles, is attained less frequently than once a year and only rarely is the high rate disastrous to vegetation.

The following official records from the U. S. Weather Bureau, N. Y., furnish accurate comparisons:

Aug. 24th, Rainfall 3.81 inches from 7.52 p. m., Aug. 23d, to 8.15 a. m., Aug. 24th.

Time— 12—1—2—3—4—5—6—7—8.

Wind vel.— 29 33 27 28 29 30 23 20.

Maximum velocity for one hour 37 miles at 2 a. m.

Maximum rate for one mile, 48 miles between 1 and 2 a. m.

Between 2 and 3 p. m. August 24th,

the wind averaged 35 miles, with a maximum rate for one mile of 42 miles. At this time no rain fell, and no damage resulted.

August 29th, Rainfall .28 inches from 4 a. m. to 8 a. m.

Time —12—1—2—3—4—5—6—7—8.

Wind vel.— 24 31 33 38 38 44 40 32.

Maximum velocity for five minutes 54 miles at 5 a. m.

Maximum rate for one mile, 60 miles at 5 a. m.

At this station of the U. S. Weather Bureau.

A wind velocity of 40 to 50 miles is attained once a month.

A wind velocity of 60 miles is attained scarcely once a year.

A wind velocity of 72 miles is the highest on record.

These figures show conclusively that, as ordinarily measured, the second storm was by far the greater—in fact, as the wind pressure is proportional to the square of the velocity it may be seen that the effect due to wind pressure alone on August 29th should have been nearly double that of August 24th. When we, however, give value to the relative rain-falls, 3.81 inches as against .28 inches, the destructiveness of the wet gale of August 24th becomes apparent.

In a storm a tree must resist a column of air moving at a high velocity and to a large degree consume its energy. This energy is proportional to the mass and the square of the velocity. Dry air has small mass per cubic foot, yet at forty miles per hour yields a pressure of 8 lbs. per square foot; at 50 miles 12 lbs; at 60 miles 18 lbs; at 80 miles 32 pounds; and at 100 miles 50 lbs. If we add to each cubic foot of air one tenth of one per cent, by volume of moisture, as for instance by partly filling it with rain drops, its weight will be nearly doubled, (.0753 plus .0625) and in consequence the energy of the moving mass will be likewise doubled. One half of one per cent of water added to the air increases the energy five fold, and thus the wind at its maximum velocity of 48 miles on August 24th, if burdened with this amount of moisture, would have an

effect greater than a dry hurricane of 100 miles. When rain falls in calm but little water is contained per cubic foot of air, but with high winds the rainfall of a large area may be carried along nearly horizontally and massed where intercepted by vertical obstacles. It is therefore reasonable to presume that trees in exposed situations receive vastly more water per square foot of surface than is measured by rain gauges in the usual way.

When wet the resistance of foilage to passing wind and rain is doubtless increased, especially when there is a tendency for the leaves and branches to mat together on the windward side, while the weight of water carried by the tree may be a considerable additional burden.

It thus becomes easy to appreciate the enormous part which water plays in the destructive force of high winds on exposed trees, as well as on the more commonly noticed windfallen grain and corn.

Dr. N. L. Britton shewed a specimen of *Agrimonia mollis* as an addition to the flora of the Island. This and the commoner *A. striata*, have been included in manuals under *A. Eupatoria* which is, however, a European species.

Mr. Arthur Hollick presented a piece of Triassic sandstone, found in the Drift at Arrochar, by Miss Grace Hollick, on which were casts of a plant stem.

Although Triassic shale and sandstone are amongst the most abundant of our Drift material this is the first specimen in which we have been able to identify any indication of a fossil. The accompanying carefully prepared drawing was submitted to Prof. Lester F. Ward, palaeo botanist of the U. S. Geological Survey, and was by him submitted to Prof. Wm. M. Fontaine, who concluded that it was probably *Equisetum Rogersi*, Schimp. If so this is not only an interesting addition to our list of Drift fossils but is of interest also on account of its rarity in the Triassic of New Jersey, from whence it must have been derived. So far as I know New Milford is the only locality in New Jersey from which it has been reported.

Mr. Wm. T. Davis read the following

miscellaneous memoranda and exhibited the specimens mentioned.

During the past summer the Periwinkle (*Littorina littoria*) has been found in some numbers alive on the shore at the Narrows, and also on the rocks at Princes Bay. In these Proceedings for January 14th, 1888, Mr. Sanderson Smith, upon the finding of an empty shell at the Narrows by Mr. Hollick, gave an account of the southward migration of the species along the Atlantic coast, noting its occurrence on Long Island, etc. This is the first record of its being found alive on our Island.

Mr. Leng recently collected in Augur Lake, near Keeseville, N. Y., a rare *Dytiscus* beetle, probably *D. Harrisii*, which he brought home alive in a tin can, as his alcohol bottle was not sufficiently large. Upon opening the can for the inspection of the insect, we were pleased to find a dark brown *Gordius* worm of unusual size. After carefully untwisting and unknotting the tangled creature, which took our united efforts, we measured it with a rule, and discovered that it was twenty-eight inches long. In Dr. Packard's zoology it is stated that hair-worms "live in ground-beetles and locusts," twisting around the intestines of their hosts.

The severe storms of the 24th and 29th of August blew many green hickory nuts from the trees, and in spite of their unripe condition the shell-bark nuts were promptly devoured by grey squirrels. Under one of the trees on Richmond hill, there were many quarts of the outer green husks gnawed fine, and of the nuts from which the kernel had been extracted after the outer bitter covering had been wholly or in part removed. It appears from this that it is probably the firmness of their attachment to the end of the tree branches, and not their green husks, that prevent unripe hickory nuts from often being eaten by squirrels.

This morning a green example of the walking-stick insect (*Diapheromera femoralis*) was found in the Clove Lake swamp on a golden rod. Though common northward, in the Hudson river valley, it is

rare with us, and this is only the fifth recorded specimen from our Island.

Mr. Davis also exhibited some exotic water plants that had been introduced by some person of an experimental turn into one of the numerous small ponds in the woods north of the Moravian Cemetery. Among them was the Chillian Mermaid-weed, the South American Pond weed (*Eichornia crassipes*), a lily and one of the sedges, all of which seem to do well among the native plants.

The president appointed Mr. Wm. T. Davis editor of the current proceedings.

Adjournment at 10.45 o'clock.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

THE OLD HOTELS OF STATEN ISLAND.

BY IRA K. MORRIS.

Special No. 14.

September, 1893.

The preparation of such an article as this must necessarily cover a number of years, as the little scraps of history are picked up incidentally, during conversations with people who possess such fragments as, when all are put together and sifted, must make the story of by-gone days and events complete.

The true history of Richmond County is always in danger of mutilation. Many of its most important records were destroyed during the Revolution; others have been imperfectly made, and many an event of incalculable value to the historian lives only in tradition and story.

I have spared no effort to be truthful with the dates and locations of the houses named in this article. I have subjected them to a number of our older citizens, and am satisfied to let the article stand as a reliable link in the history of Richmond County.

It is generally believed that the first hotel erected on Staten Island stood on the shore near the site of the Pavilion Hotel, Richmond Terrace, New Brighton. There is a theory that it was erected and maintained by Kieft, the director of the Province of New Netherlands, who erected a still on Staten Island, somewhere in the vicinity of Brighton avenue and Jersey street, New Brighton. It was the first still erected in America. Kieft, according to history, "was an indiscrete and imprudent man, and eminently possessed of the Dutch attributes of obstinacy and self-will." It was he who provoked the first battle between the Indians and whites on this continent, as he wanted to punish the Indians for an alleged theft. There can be no doubt that the outrage which he and his men perpetrated upon the Indians of Staten Island, laid the foundation for the hatred for the white man which is now the "nat-

ural bent" of all the Indian tribes in America. The still, alluded to, was erected in 1640, and there is no doubt that the tavern was built very shortly afterward, and was probably the home of Kieft while on Staten Island. A description of the building says "it was a stone house of Dutch fashion." From this we assume that it was one-story and attic, with dormer windows in a long, sloping roof, and strongly resembled the other Colonial buildings still standing on the Island. "The windows on the ground floor," says the same description, "were small and secured with iron bars, so close together that it was impossible for a child to crawl between them." There was a boat-landing in front of the house, which was maintained up to the early part of the present century. During the Revolution the house was known as the King's Inn, and was occupied at various times by the British commander of the troops stationed at the entrance to the Kills. One night, while an officers' ball was in progress in it, a detachment of Continentals "set a trap" for the flashily dressed gentlemen who were participating in the pleasures of the occasion, and by securing the presence of one at a time, succeeded in capturing a number and carrying them off prisoners of war. A portion of the foundation of this house is still remembered by some of our older citizens.

The "Rose and Crown" stood at the head of New Dorp lane, a few feet back of the site of the hotel recently erected at that place. It was built by a Huguenot, one of the first settlers on Staten Island, in 1665. Several important treaties were here effected between the Provincial authorities and noted chiefs, and the Richmond County Courts were held in its parlor, at intervals, for many years. Sir William Howe occupied it as his headquarters on July 4th,

1776, and as he remained there for some time, it requires no effort on our part to picture many brilliant scenes beneath its roof. Howe was wealthy and fond of pleasure and show. He gave receptions there very frequently, and entertained such distinguished comrades in arms as Generals Clinton, Cornwallis, Percy, Pigot, Agnew, Erskine, Skinner, Monckton, Andre, Billopp and scores of others. It was in this house, too, that Sir William gave the memorable reception to Margaret Moncrieffe, who described the event very vividly in her "Memoirs." When Sir William was relieved of the command of the British forces in America, he was succeeded by Sir Henry Clinton, and he, too, made the "Rose and Crown" his headquarters. General Knyphausen afterward occupied it, when left with his Hessians to guard Staten Island. Its last "royal" occupant was Colonel Danforth, Assistant Commissary General of the British Army, upon whom devolved the responsibility of securing such property as the army had left behind when it evacuated the Island. Colonel Danforth returned to this country a few years afterward, and stopped for a long time in the old "Rose and Crown." In his "Journal" the Colonel portrayed the glories of "beautiful Staten Island." The last owner of the "Rose and Crown" was the late Leonard Parkinson. The building was demolished in 1856.

Cucklestowne Inn stood on the spot now occupied by the residence of Mr. Willis Barton, in Richmond Village—"Cucklestowne" being the name of the village up to its adoption as the county seat, in 1727. It was erected in 1670. Other than being one of the first buildings erected on Staten Island, no particular importance is attached to its history up to the commencement of the Revolution. During the week or so following the Declaration of Independence, the British army rested from its defeats, marches and voyages, as best it could, on Staten Island. It was within a few days after this event that General Cleveland, the Chief Engineer of the British Army, selected various points on the Island, on which to build the "redoubts" or forts. He was the first British officer to occupy the old Cucklestowne Inn, and he remained there while superintending the construction of Fort Richmond, which is still standing on the high hill-top back of the village. General Cleveland personally superintended the construction of each fort on the Island—about ten in all. Several other officers of high rank occupied this house at times; but the one most notorious of all was Lieutenant-Colonel Simcoe, of the "Queen's Rangers." He was, by nature and practice, fully able to sustain his reputation as the outlaw of the Revolution. Colonel

Simcoe and Major Andre were very intimate, and while the latter was serving as a captain in the Twenty second Regiment of Foot, stationed at Richmond, both occupied rooms in this old house. Captain Andre, (afterwards Major), wrote his will in the Cucklestowne Inn and, there being no county government on Staten Island during the Revolution, he had the document recorded in the County Clerk's office in New York City. It was admitted to probate on the week following the execution of Major Andre as a spy. Colonel Simcoe, as was the custom of the day with educated people, kept a "journal" and some of his comments upon the action of Washington, written in the Cucklestowne Inn, are very ludicrous to the impartial reader of history. Colonel Simcoe petitioned the British commander for permission to take the "Queen's Rangers" and re-capture Andre, at all hazards! Indeed, one of the unaccountable secrets of that great event was that the British commander, (Clinton), for a reason that may never be known, treated the Andre affair with the utmost indifference throughout, and the government for which he gave his life did little more. Cucklestown Inn was demolished in 1823.

The Old House by the Mill, at Green Ridge, was erected by one of the early Waudensian settlers. The exact date is not known; but from an old document describing the early homes of this vicinity, it is safe to assume that it was built about 1685—probably earlier. It was originally partially surrounded by a high embankment, or fort, as a protection from Indians and pirates, as both, in those old days, used to make incursions up the Fresh Kill Creek. At the time of the erection of this building, the neighborhood was known as Kleine Kill, (meaning Little River). A century later it was called Marshland; but about thirty five years ago, it was changed to Green Ridge. The house became a hotel at a comparatively recent date.

Purdy's Hotel, at Seguine's Point, Prince's Bay, is one of the oldest buildings on Staten Island. There is substantial reason to believe that it was erected as far back as 1690, and was the home of one of the original Huguenots that settled on Staten Island. It belonged to the well-known Seguine estate, and by many residing here to-day is confounded with the original Seguine homestead. I find indisputable proof of this error in the Richmond County *Free Press* of 1835, which gives an account of the burning of the old Seguine homestead, and adds that "the building was totally destroyed." There was a military out-post at Seguine's Point during the Revolution, and Mr. Purdy's house was occupied as headquarters for a time by the British General, Vaughan. There was a

spirited skirmish between the Continentals and the British, and Colonel Illing, of Sir William Howe's staff, who was bearing a message to General Vaughan from the commander-in-chief, was fatally wounded and died in this house. Colonel Illing belonged to a wealthy English family. His remains, which were buried near the old house, were exhumed almost immediately after the declaration of peace, and carried back to his native land. The quaint old place has been the property of Mr. Purdy for several years, and is in a remarkably good state of preservation.

The Ferry Tavern was located on the bluff, near the terminus of the Amboy road, Manor of Bentley, now Totteville, on the present site of Captain C. C. Ellis's pavilion. A ferry was established at that point as far back as 1650, by the Raritan Indians, who were on friendly terms with the Dutch. Shortly after that period it was found necessary to have "a place for protection of ye passengers in waiting," and a small log cabin was built. During the outbreaks of the Indians the building was repeatedly destroyed. The three generations of Billopps which lived in the Manor of Bentley, maintained this ferry. Thomas Farmer Billopp, who stood at the head of the second generation, caused to be built the little building, (which is still remembered by many of our people as the Ferry Tavern), about 1740. It was a part of the property confiscated by the Government, belonging to Colonel Christopher Billopp, at the close of the Revolution. At one time it was the only public house within several miles of Billopp's Point. Captain Delotz, a Hessian soldier, kept it for a time after peace was declared, and it was a rendezvous for many years for his old companions in arms, who had left the English service. Nothing more is known of the house until 1825, when John Fountain became its manager. He continued with it until late in the thirties. William Coddington, of Woodbridge, was its next proprietor. He was the largest man in this part of the country, and it was only with a great effort that he could move about. Its last proprietor as a public house was Henry Biddle. It was for several years the club house of the "Clever Fellows," of New York City, an appendage of Tammany Hall, and in a very mysterious manner, after a night's skylark, in 1866, the old house was burned to the ground.

The Bull's Head Tavern, a long, low, shingle sided building, stood near the spot on which the blacksmith shop of that little hamlet now stands. It was first built in 1741, and was enlarged twice before the Revolution, when it became famous as the headquarters of the Tories for this part of the country. A large sign used to swing in front of the house, upon which was painted

the head of a ferocious bull. The house was managed during the Revolution by one of the Hatfields and a notorious criminal named Bartley. Hatfield was a relative to the leader of the Tory gang, which murdered, robbed and plundered everybody that happened to be in the way. It is no exaggeration to claim that at least a dozen murders were committed in the old Bull's Head Tavern by the Hatfield gang. According to tradition the history of each murder or robbery was written on the board partitions of the dingy bar-room, and orgies that would put to shame the most fiendish of Indians were held therein. Every device imaginable was resorted to to entice unsuspecting people into the house, and it generally depended upon their skill and courage to get out alive. The stories of the depredations committed by the Hatfields in this old house sound more like fiction than truth. Several times the people of the Island attempted, in a quiet manner, to burn the house to the ground; but the flames were extinguished as often as the torch was applied. On the day the British left Staten Island, the climate became very warm for the Hatfields, and they moved around cautiously for a long time. Several of the gang left the Island; but enough remained to keep up the family name in Northfield, where it may be traced to this day. It is said that in one of the celebrations of the anti-royal element on the Island, there was an attempt to burn the Bull's Head Tavern; but the flames were again extinguished. Its charred timbers were replaced by fresh ones cut from the woods near-by, and it was re-opened by one Lynch, who kept it for a time. During the days of coaching it became very popular with people travelling between New York and Philadelphia, as it was a "relay station" where the horses were exchanged and where passengers got sumptuous "meals at all hours." People from all over the country made special trips to the old house, just to see the "Tory headquarters" and to listen to the horrible stories that made up its eventful history. It was later on the residence of Judge Garretson, the grandfather of Mr. John H. Garretson, of Green Ridge. Few of the people now living on Staten Island ever saw the old Bull's Head Tavern, for it crumbled into dust many years ago.

The Black Horse Tavern, at New Dorp, was built in 1754, and was known as the "Wayside Rest" until 1776, when it was occupied by members of the staff of Sir William Howe. One of those gentlemen, a Lieutenant-Colonel, and "my very dear friend Benton," as Sir William called him, owned a handsome black charger, which was generally believed to be the fastest running horse in the British army. He

won scores of races on old New Dorp lane. One day there was to be a general review of the army at New Dorp, on the arrival of Lord Howe, Sir William's brother, and Colonel Benton mounted his handsome horse preparatory to escorting Sir William. Immediately after mounting, the horse took fright and ran away. A high rock stood a short distance from the hotel, against which the horse dashed and instantly killed both the rider and itself. Fellow staff-officers who witnessed the accident, decided at that instant to change the name of the house to the "Black Horse Tavern." A sign, bearing the picture of a black horse, was painted by a British soldier and was placed in front of the house. It was lost for many years; but it is now in its original position. It was at this house that Hatfield, the Tory leader, used to report his depredations and receive his instructions and rewards. It remained a public-house until some time after the "late war." About ten years ago a gentlemen from New York purchased the property and remodeled it for a private residence. A year or so later it was purchased by Mr. Patrick Curry, who enlarged it and opened its doors once more to the public. It is still in Mr. Curry's hands.

Bennett's Tavern was erected in 1768, and stood where Mr. Greenwald's store is located, on the corner of Richmond Terrace and Richmond avenue, Port Richmond. Little is known of its early history. Its last proprietor was Captain John Bennett, who managed it for many years. It was demolished about twenty-five years ago. I have been informed that the first Sunday-school organized in this country met on this spot under the management of the Dutch settlers.

One of the oldest buildings on the North Shore was the little stone tavern that stood about where Mr. William C. Van Clief's lumber yard is located, at Port Richmond. It stood long before the Revolution, and was demolished in 1855, when the late John H. Van Clief purchased the property from Commodore Vanderbilt. The Steamboat Hotel, built about 1840, and located a few yards east of the former, became its successor. Both were, "in their day," headquarters for boatmen.

"The Stone Jug," as the old Neville mansion near Sailors' Snug Harbor, is facetiously called, was, until 1882, a private residence, and was one of the most homelike places on the North Shore. According to statements made to the writer by old citizens, this house was erected about 1770. It was a farm house later and belonged to Jacob Tysen, County Judge, the farm containing all the land now included in the property of Sailors' Snug Harbor and extending almost to "Brighton Corner." The house, and the beautiful lawn in front, dotted with rare flowers and studded with majestic poplars, used to be the pride of the venerable Captain John Nevelle's heart. He was a retired officer of the American navy. The house has been the scene of many a gay reception, given in honor of distinguished members of the navies of our own and other countries. To one who reveres the links that bind the dim past to the busy present, there arises a regret that

the past and present of this old house are so far different.

The Union Hotel, at Tottenville, was for the better part of a century a farm-house on the Johnson estate, and was but a story-and-a-half high. It was first erected in 1784. Abram Johnson was its last occupant before it became a public-house. The former parlor of the house is now the large, low-ceiled bar-room, and it was in this very room that Commodore Vanderbilt was married to Miss Sophia Johnson in December, 1813. It was her home. Captain Abram Latourette purchased the property from Abram Johnson in 1865, and added several stories to the building, and then opened its doors to the public. It has changed managers many times since; but it is still the property of Captain Latourette.

The Red Horse Tavern was the name of a small public house that stood near Stony Brook, about a quarter of a mile from the Black Horse, during and for many years after the Revolution. Like almost all of its Colonial companions it was permitted to crumble to the ground. There are a few old citizens of the Island who remember its ruins.

The long, low building standing near the foot of Rossville avenue, (originally Ferry road, and for many years known as Shea's lane) in, the village of Rossville, was standing long before this century was ushered in. There is no question that it was built before the Revolution. When this century was "in its teens" it was the only tavern in the vicinity, and was kept by Mr. Oakley, father of ex-Supervisor Jesse Oakley, who resides near it at the present time. The house has been changed a number of times from hotel to private residence, and is now occupied as the latter by Mr. Thomas Vaughan. Many interesting incidents have occurred in it, principally of a political nature. The boyhood days of Mr. James A. Bradley, the founder of Asbury Park, were spent with his father and mother in this old house, while "the boy Jimmy," as some old residents still call him, went to the little country school over at Woodrow.

The Washington Hotel, in Richmond, for nearly fifty years under the management of the late Michael Curry, was originally a small private dwelling. It was enlarged from time to time, and was finally converted into a hotel, with a public hall and ball-room. A portion of the building was erected as far back in 1790. It is now rapidly going to decay. No even of any particular importance transpired here; but it was the scene of many a happy gathering of the young men and women of the Island for generations.

The Swan Hotel is the venerable building on Richmond Terrace, West New Brighton, for many years the residence of Mr. C. M. Pine. It originally stood on the adjoining ground now occupied by the brick building lately used by Messrs. C. M. Pine & Son. It was erected about 1792. An interesting event occurred in this old house on July 4th, 1825, when the colored people of Staten Island, together with their friends from Long Island and New Jersey, held a grand celebration in it, in honor of the abolition of slavery in New York State. All the officials of Richmond County were entertained by the colored people in high style. The negroes had a three-days' celebration, practically, for they commenced on the 3d to gather to the scene, and remained until the 5th. The embankment along the Kills, opposite the Swan Hotel, was covered with cedar trees, and it was there that a great majority of the ex-slaves, hundreds in number, took up their abode during their stay. There is living on the Island but one colored person who was present at the celebration in the character of an emancipated slave. Mr. Michael Tynan, the father of Mrs. John T. Barrett, was the last manager of the Swan Hotel as a public resort.

It is now the property of Mr. James Wheeler.

The Fountain House, on Richmond Terrace, West New Brighton, was erected near the close of the last century, and for many years was known as the Shakespeare Hotel. It was for half a century the most popular resort on Staten Island for balls, entertainments and public meetings. The first invitation ball ever given on Staten Island was in this old house early in "the forties," and such an innovation was it upon the established customs of the time that the Tompkins Guards, the military company giving the ball, had to drive out riotous intruders, at the point of the bayonet, those who felt the slight at not being invited. The bitterness engendered on that occasion has, in several instances, passed down to a third generation. The Fountain House ceased to be a hotel in 1859, and is now the property of Mr. Frank W. Tompkins. Wendell Phillips, accompanied by George William Curtis, delivered one of his famous abolition speeches on the steps of this house.

The Cliff House, a few hundred yards east of Fort Wadsworth, was standing in 1794; but the time of its erection is unknown. Richard Silva kept the house at the commencement of this century, and continued with it for about twenty-five years. The wife of the late venerable Captain James Stillwell of the Staten Island ferry, was born in this house in 1807. She was the daughter of Mr. Silva. The house was then known as Silva's Cliff Inn. The military post now known as Fort Wadsworth was State property during the War of 1812, and the little fort was commanded by Captain Ephraim Clark, father of the late Dr. Ephraim Clark, of New Dorp. Captain Clark and a detachment of his troops guarded the house for several weeks, to prevent its destruction, as British sailors made two or three attempts during the war to destroy it by fire. Captain Clark's home was near Rahway, N. J., and about two-thirds of his men came from that vicinity; the remainder were Staten Islanders. The Captain and his wife were buried in the graveyard of the Port Richmond Reformed Church. The Cliff House was for many years of late occupied by a private German Club, under the management of Mr. Joseph Kost. It is now a summer boarding house.

The Port Richmond Hotel was built about 1807, and was the private residence of Judge David Mersereau. It stands on the site of the home of the notorious Decker, who took an active interest in the welfare of the British during the Revolution, and acted as a guide to them on various occasions. Decker's house was destroyed by fire during a raid by General Sullivan. A small fort was erected on its site. At the time the Mersereau house was built it was considered the handsomest residence on the island. A great deal of hand-carved wood-work ornaments the interior. The old-fashioned hall, and large, square rooms remind one of the many gay scenes that have occurred there in days of yore. There was a lawn in front of the building which extended to within a few feet of the (present) opposite sidewalk, and many people residing in Port Richmond to-day can recall two large willow trees that stood in front, about where the middle of the street is now located. The Mersereau farm, upon which this house stood, consisted of that portion of Port Richmond bounded by Richmond avenue, the Shore road and Palmer's run, south to the Post farm—all the streets between the meadows and old "Church road" being cut through it. About 1828, the house was sold and converted into the Port Richmond Hotel, and a few years later its name was changed to the Continental Hotel. Recently it was changed again to the St. James. It was in this house that Aaron Burr spent nearly the whole of the closing year of his life, and many distinguished people called there during that time. On June

17th, 1836, the anniversary of the battle of Bunker Hill, which the company always celebrated, the Tompkins Guards, of West New Brighton, under command of Captain John Laforge, paraded along the North Shore, and had their annual dinner at the Continental Hotel. On behalf of the company, Captain Laforge invited Colonel Burr to dine with it; but, as he was too feeble to attend, he declined, and invited the officers up to see him. They accepted the invitation and had a very enjoyable time. The visitors were Captain John Laforge, Lieutenant D. V. N. Mersereau, Ensign Smith B. Freeman, and Orderly Sergeant Richard Christopher. The latter afterward became captain and is still living in West Brighton. It was in this house, in the room on the northeast corner of the second floor, that Aaron Burr died, on the 14th of September, 1836. The house is still open to the public.

Nautilus Hall, Tompkinsville, was built by James Guyon, father-in-law of the late Dr. Ephraim Clark, of New Dorp, (grandfather of Dr. James G. Clark, of West New Brighton), in 1808. It very soon became a political resort. New York politicians held brief outings there, for the sake of talking over matters at the distant Metropolis. It was the Democratic centre of the island for many years. A grand reception was given to Lafayette in this house, in 1825, on the occasion of his last visit to America, and many distinguished heroes of the Revolution and the War of 1812 were present. Kossuth was also entertained here in style. He made an eloquent address on its piazza. Garibaldi visited it frequently, while residing on Staten Island. For the better part of a century its beautiful lawn and fine old well were great attractions for people from near and far. Both were destroyed by the building of the Rapid Transit Railroad. The house was enlarged by Mr. Frank Jones in 1855. It is now controlled by Mr. Henry Burrows, who secured it in 1885.

Bodine's Hotel, at Castleton Corners, (or Four Corners, as the place used to be called), was originally built in 1815. In the days of stage coaches it did its share of entertaining the traveling public. The well, which still stands in the street nearly in front of this house, and which is over a century old, made this a popular stopping place in those old days. For generations man and beast delighted in the sparkling beverage which it has never failed to provide. In the old training days, "before the late war," this house was the headquarters of the Castleton contingent. It was purchased several years since by Mr. Thomas Keene, the celebrated actor, and it is there that his family resides the year round, and where Mr. Keene himself rests from his labors when off the stage.

The Pavilion, on Mount Tompkins, (or, as the present generation calls it, Pavilion Hill), at Tompkinsville, was a popular resort as far back as 1815. It was a delightful place in summer. Staten Islanders used to hold entertainments up there for the benefit of churches and military organizations, and it was the mecca for New York excursionists. In the early part of its existence it was a favorite place at which to celebrate the Fourth of July. Old citizens of the island inform me that they remember having heard addresses there by Martin Van Buren, William H. Seward, Daniel D. Tompkins, Governor Ogden and William H. Pennington. Many years ago the Pavilion, a long, low, wooden structure, caught fire in the night and burned to the ground. It was re-built, and in the course of time lost its popularity with the better class of people, and finally became a questionable resort. Prize fights, gambling scenes, and similar events marked its career. Again it caught fire and burned to the ground. Time has completely obliterated the last vestige of its existence. The view from the hill is

one of the most fascinating within the suburbs of the Metropolis.

The Rossville Hotel was built in 1825, by John Eddy and Robert Seguire. It was the property of Joseph Seguire, uncle of the late Henry Stewart Seguire. Its first manager was Israel Oakley, who was Sheriff of Richmond County in 1834; Member of Assembly in 1838-39-41; Supervisor for Westfield in 1840 and 1850, and held various other positions of trust. He was a Whig. For many years before the hotel was built the location was known as "The Blazing Star Landing," and the house took its name from the place. When, in 1836, Colonel Ross built his "Castle," (now the residence of Dr. Lyon), the name of the place was changed to Rossville; but the old Blazing Star Hotel remained unchanged for a generation. Prior to the building of the Staten Island Railroad, Rossville was one of the most important steamboat landings on the Island, and, consequently the old Blazing Star Hotel shared its importance. It was one of the "voting places" in the times when the ballot-box was kept open for three days, and a story is told of a general fracas taking place here between the adherents of Andrew Jackson and John Quincy Adams on the first election day of "Old Hickory." A portion of the building is still occupied as a hotel, and the post-office and village store are in the remainder. It belongs to the estate of the late Henry Stewart Seguire.

Union Hotel, Richmond, was erected in 1830, and stood on the lot adjoining the Old Red Jail. It was for many years a private residence, and was converted into a hotel about 1842, by John Fountain; but ceased to be used as such more than twenty years ago, when it again became a private residence. A portion of it was occupied for a time by the King's Daughters, where they had their reading room and held their meetings. It was destroyed by fire in 1892.

The Commercial Hotel, at Tompkinsville, was established in "the twenties." In March, 1830, it is advertised in the Richmond County *Republican* as follows: "To Let—The commodious and convenient establishment known as the Commercial Hotel, situated in the village of Tompkinsville, about two minutes' walk from the steamboat landing. The house is three stories high and in good repair, with double piazza, &c. Richard Harcourt, near the premises."

The Union Garden was located at Tompkinsville, and was established in 1820. The *Republican*, of September 11th, 1830, advertises it as follows: "The elegance of the location of this establishment as respects elevation, romantic scenery and extent of ground, now rendered more beautiful by its late and extensive improvements, together with the advantages afforded by its proximity to the Quarantine wharf, it being situated but a pleasant promenade south of the same, now offers to parties or individuals, either public or private, military or civil, all those necessary advantages; and from the variety and quality of his dishes, wines, liquors, ice creams, &c., those choice luxuries that persons wishing to retire from the fatigues of labor, the noise of the crowd, or the tiresome confinement that a voyage at sea may cause, can be had in as good style as they may wish." J. D. Crew was the proprietor. I am informed that this "Garden" was located near the old Commodore Vanderbilt residence, on Bay street, on the hill-top that has since disappeared before the march of progress.

The Bloomingview Hotel was located on the Amboy road, a short distance north of the Prince's Bay railroad station. It was erected in 1821, and was once a popular resort with mail coach travelers and sportsmen from all over the country. It ceased to be a hotel many years since, and after comparative uselessness for a long period, was finally purchased by Mr. William

H. Starin, and at great expense fitted up for his private residence. It is still Mr. Starin's home.

Richmond County Hall stood in the village of Richmond, on the site of the building now occupied by the King's Daughters. It was erected by a company of county capitalists in 1822, and was the political, business, sporting and social headquarters for nearly half a century. Application was made to the Legislature in 1828 for an act to incorporate the Richmond County Hall Company, with a capital stock of \$10,000. This hotel had a national reputation, and many prominent people were entertained beneath its roof. A public hall was attached to it in which the political conventions of the Democrats, Federalists, Whigs, Know-Nothings, and Republicans were held. Congressman Obidiah Bowne, at one time the most influential citizen of this district, committed suicide in this house. William H. Vanderbilt was an habitue of it for many years, and was a member of a club called "The Owls," which held all-night sessions there. The last Whig convention held in Richmond County was at this house, and Mr. Vanderbilt was its chairman. At that time he resided on New Dorp lane. It was a favorite resort of the old Commodore, too, at one time. Richmond County Hall closed its doors as a hotel several years since. O. P. Hodge was its last proprietor. It was occupied privately for a brief period. It had crumbled into a complete wreck when, two years ago, it was totally demolished. Richmond County Hall will be a familiar by-word to the people of Staten Island for many years to come.

The Patten House, New Dorp, was for many years one of the main hotels of Staten Island. It was the military headquarters of the division in which Richmond County was located, and also of the 14th Regiment, N. Y. State Militia, which was composed exclusively of Staten Islanders. Col. Patten, a southern planter, who had managed the old Merchants' Hotel, on Cortlandt street, New York City, was its first owner. It was built by Lawrence Hillyer, of New Springville, in 1837. Scarcely an issue of the old county papers appeared without some allusion to the Patten House. Public meetings, balls, courts martial, officers' councils, and kindred events were constantly going on. Sporting men sought it, too. It witnessed many changes in time. Its last manager was Colonel Lux, commander of the Eleventh Regiment, N. G. S. N. Y., and its doors were closed to the public in a few weeks after his death in 1882. Shortly after that it was purchased by Father McGlynn and fitted up for a home-school for homeless children. It continued as such until Father McGlynn had trouble with the Pope, and it was again made vacant.

The Pavilion Hotel, of New Brighton, has long been one of the most fashionable summer resorts of the country, and is known the land over. The central part of the original building was first projected as the private residence of Thomas E. Davis, Esq., about the year 1828, but on its being converted into a hotel about 1832, "an immense saloon was erected in the rear and two wings were added, each of which," says an old paper, "is considerably larger than the original building." The main building was originally two stories in height. In 1857, we read that "the colonnade in front of the building affords a promenade more than two hundred feet in length. The saloon is 80 by 75 feet, with a large dome and pendant chandeliers, suspended by a multitude of chaste Corinthian pillars. A covered promenade of the same length as the colonnade connects the three divisions of the pile, and presents comforts of the dry pave at all seasons. * * * All the rooms in the house have elegant Italian marble mantles, and are furnished in a degree of elegance and luxury rarely equalled by the largest hotels of the cities." Mr. Milford was proprietor of the Pavilion at that time. It has witnessed many changes since. In 1884, the original centre

building was torn down, and the present (centre) edifice erected. For many years "before the war" the Pavilion was liberally patronized by wealthy Southerners. Its old registers contain such names as General Winfield Scott, Henry Clay, General Santa Anna, Martin Van Buren, C. L. Vallandigham, John C. Breckenridge, Horatio Seymour, Jennie Lind, Mlle. Patu, Signor Brignoli, and scores of others equally prominent. Mr. Adolph E. Dick is the present proprietor of the Pavilion, and his splendid reputation enables the house to retain its well-earned popularity.

The Old Track House was originally a farmhouse, and stood on the fair grounds, when the Agricultural Society was organized, near the beach, foot of New Dorp lane, in 1823. It was a resort for horsemen for several years, as some of the best horses in the country were speeded on the track at that place. Its popularity did not wane when the Agricultural Society moved to its new quarters between the railroad station and the Patten House. Gunners patronized the Old Track House as long as it stood, for it was located in a pleasant, out-of-the-way place, and was very inviting. James (Jordan) Bennett, Jr., used to enjoy himself very much there. He was an expert marksman, and he used to enter into contests with the best that came. He left thousands of dollars in that house. The Track House burned down many years ago. The land on which it stood is a part of the old homestead farm of William H. Vanderbilt, and is now owned by his youngest son, George W.

The Old Club House, on Clark avenue, near Court House station, was the first independent club-house established on Staten Island, so far as the writer is aware. The club was organized in 1828, and the house erected shortly afterward. Among the members of the club were Dr. Doane, Health Officer of the Port; Dr. John T. Harrison, who also held the same office and represented this county in the Legislature; Commodore Vanderbilt, Dr. Ephraim Clark, Colonel Richard Conners, Minthorne Tompkins, and many others whose names have passed into oblivion. When the club was disbanded, many years ago, the house became a hotel; but was used as such for only a short time. It was a private residence until about six years ago, when it was enlarged and converted into a hotel again.

The Quarantine Hotel was located near the steamboat landing, at Tompkinsville, and was established in 1829 by John V. Fountain. Later it was managed by S. W. Jennings. Its career closed with the burning of the Quarantine hospital.

The Planters' Hotel, on Bay street, Tompkinsville, a portion of which is now occupied by Mr. Loeffler, the photographer, was for many years one of the most aristocratic resorts of Staten Island. It was built by a Southerner, in 1829, and patronized almost exclusively by wealthy Southerners for many years. Many of the distinguished people of the South have been entertained there, among whom were John C. Calhoun, Jefferson Davis and Wade Hampton. After it ceased to be a hotel it was converted into a boys' academy.

The old-fashioned brick building standing on the north side of the railroad track, by the Port Richmond station, was erected in 1830, by Judge Mersereau, who sold it to his brother-in-law, the Rev. P. J. Van Pelt, and it consequently became the parsonage of the Dutch Reformed church. Some time after the death of Dr. Van Pelt it was sold, and it remained a private residence until the opening of the Rapid Transit Railroad at that point. It was then converted into a hotel.

Belmont Hall, New Brighton, was erected in 1832, and was the private residence of Mr. Lawrence, who conducted a distillery nearly opposite on the bank of the river. After a few years it was sold and enlarged, and soon became one of the most popular and successful private military academies in the country. Major Duff, who was its principal, was a graduate of

the West Point Military Academy, and had attained his title in the regular army. He was appointed colonel of a New York regiment, at the commencement of the Mexican War. He was an efficient officer, and distinguished himself in a number of battles. He became a victim to yellow fever, and he slept in his grave in the land of the Montezumas before victory was proclaimed. Among the graduates from this military academy were Fred. Barclay, son of the English Consul; Major Dennison, who distinguished himself while serving in Duryea's Zouaves, during the Southern Rebellion; Mr. John Pendleton, now residing in New Brighton, and a score of others whose names are familiar throughout the country. Belmont Hall, upon the death of Colonel Duff, at once became a hotel, and it has remained so ever since. For many years it has been a temperance house. Three churches have been organized in its parlor.

The Dock Hotel was built at New Brighton in 1834, and was managed by Thomas Carey. A portion of the building is still standing, and is now used by Messrs. James Crabtree & Son, coal dealers. The ferryboats "Sylph" and "Staten Islander" made two trips a day to and from New York City, and landed at the door of this house. It was the rendezvous of the Castleton politicians. When the steamboat landing was transferred to the foot of Jersey street, the Dock Hotel ceased to be a public house.

The Windsor Hotel, at New Brighton, was originally the residence of Mr. Wilkinson, of the firm of Crabtree & Wilkinson, silk dyers at New Brighton. It was the property of the New Brighton Land Association. The house was erected in 1835. In 1845, Mr. Wilkinson died, and it was some time afterward enlarged and converted into a hotel. It has had many managers. Two years since its doors were closed to the public. This house was known as the Mansion for a long time, and "in its day" was quite popular.

St. Mark's Hotel stood where the magnificent Hotel Castleton now stands, on the heights of New Brighton. The "Marble House," which formed a part of the old structure, was built by Gilbert L. Thompson, a son-in-law of Governor Tompkins, in 1825. It was Gilbert Thompson who aided Santa Anna to escape from Mexico, in 1848, and the fallen emperor was here entertained. The "Marble House" was purchased by August Belmont, and the noted banker and his family resided there for a number of years. When it was converted into a hotel a large addition was built to it. It was a very popular summer resort for many years, and it numbered among its guests some distinguished people. St. Mark's hotel was demolished in 1889, and the Hotel Castleton erected in its place.

The Castleton House is the square, frame building standing on Broadway, West New Brighton, opposite the public school. It was built by Capt. John Laforge in 1837. Captain Laforge commanded the Tompkins Guards, and the house was more or less a military centre for the North Shore. He was also a foreman of the Old Staten Island Dyeing Establishment. The house has long been occupied as a tenement.

The large, square building standing near the head of Main street, in Tottenville, was built by the late Israel Butler, in 1850, and a select school was conducted in it for several years. Then it was rented by "Uncle" Joseph and "Aunt" Sally Christopher, (who were well known in connection with old Richmond County Hall), and they managed it some time as a temperance house. But after a while it became a full-fledged tavern. For the past twenty years it has been a private residence.

More than a score of other hotels I have learned about, while gathering material for this article, that have long since faded from the sight and mind of the busy public; but as I could learn nothing of special interest in their history, have deemed it best to pass them by. And I have also omitted many interesting incidents in connection with those hotels of which I have written, fearing that I may have already trespassed upon the patience of those who are to read or listen to these stories of the past.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION OF STATEN ISLAND.

Special No. 15.

September, 1893.

The Old Ferry to Staten Island.

More than fifty years, man and boy, was William Olliff, until recently, ticket agent at Tompkinsville, employed by the various individuals and companies that have run boats between Staten Island and New York, and from him these reminiscences of the early days of the ferry have been gleaned.

When he first stepped upon the deck, the city had a population of less than 300,000 and traces of the great fire of 1835 yet abounded in its business district. Staten Island had less than 20,000 inhabitants and a trip to the city, occupying under the most favorable conditions considerably more than an hour, partook somewhat of the nature of a voyage and, to the majority of Staten Islanders of that day, rose almost to the dignity of an event.

Looking toward New York, our shores presented a more attractive aspect than they do now. New Brighton, owing to the exertions of the Brighton Company, an association of English capitalists, had begun to take on a modern look, and the Pavilion was a new hotel which, by its size and general magnificence, astonished the natives. New Yorkers in considerable numbers had begun to travel to and fro on the boats, but the business men of that era were staid merchants, who would be amazed at the new order of things and the new methods of trade, could they be set down in the busy commercial centre of the New York we know, and to which we travel daily in comfortable cars and upon commodious boats, which would have amazed our fathers by their elegance and appointments, and disgusted them by their lack of a bar.

In the early days of the ferry, James Gordon Bennett, the elder, was emerging from his struggle to establish the New York *Herald* and was a frequent passenger in the summer. Even the great editor, upon whom the management of the paper devolved, found it possible to give from two to three hours each day to travel between his residence and his place of business, and that at a period when the telegraph was unknown and the telephone undreamed of; when the pony express by land and the fleet yacht by sea were the approved and usual news getters for the most enterprising journals.

Dr. Westervelt and Mr. O. Mauran, the latter a Cuban, who spent his winters in Havana, were the proprietors of the line in 1838; the boats ran from about the present Ferry House in New York to the foot of Arrietta street, and made no other landings on Staten Island. The boats were the Bolivar and the Hercules, also the Nautilus, diminutive craft that in addition to their passengers could carry but a wagon and team, provided the team were detached. The first boat to the city—we had no brewers on the island then—left Tompkinsville at 8 a. m., and the first from the city at 9 a. m. There was no South Ferry at that time, but a slip ran up Whitehall street, nearly to Front street. The whistle of the last boat from Tompkinsville sounded at 5 p. m., and the business man who did not catch the 6 p. m. boat from New York had to stay there all night. The fare each way—and money was by no means easy in 1838—was an English or Spanish sixpence, which was held to be equivalent

to 12½ cents of our currency. The fare was collected aboard each boat. The only fuel used in the furnace was pine wood, but as we have already said, there was other fuel to be had at the bar, for many years afterwards a feature of each boat. Among the better known passengers whom Mr. Olliff distinctly collects, were alderman John Y. Cebra, after whom Cebra avenue was subsequently named, H. K. Fountain, Jacob L. Wood, Daniel R. Hitchcock, Judge Ward, Ray Tompkins, Daniel D. Tompkins, whose father had been Vice President of the U. S., Minthorne Tompkins, J. C. Thompson, Dr. Hollick, Madame Grymes, whose residence stood on a hill that bears her name, the Nesmith brothers, John C. Greene, M. Aspinwall, the Griswold family, John I. Boyd, W. Van Wagener, Capt. J. Vanderbilt, Samuel Bowen, Levi Clark, Mr. Townsend, editor of the *Express*, Seth Geer, architect, Dr. Harcourt, Sam Ward, Baron Von Hoffman and Baron Belmont, whom many of our older inhabitants will remember.

The Sampson, a large, powerful double end steamer was added to the fleet before 1840. The Columbus, a large steamer, about this time sank at the foot of Whitehall street. The pilots at that day had not acquired the knack of managing double end boats, and the Sampson had to be remodeled. The Sampson was the first of our ferryboats upon which teams and wagons could stand without unhitching.

When the ordinary route to Philadelphia was closed in winter, it was customary to transport passengers and goods across the bay by way of the Staten Island ferry, then to Blazing Star ferry and on to their destination; the trip requiring not less than two days. The Hunchback was put on the line in 1851, the morning boats from Tompkinsville at this period still left at 8 and 10 a. m. The first mid-night boat began to run in 1854, to ac-

commodate the Staten Islanders who attended the Jenny Lind concerts, and these late boats ran subsequently when Madame Sontag, who, during her engagement lived on Staten Island, electrified New Yorkers. In 1852, Commodore Vanderbilt, who had owned the line for some years, sold it to George Law & Company.

On January 18th, 1864, but three trips could be made from the island on account of the ice in the harbor. It happened more often in the past, owing to the small amount of traffic, that the bay, in winter became so packed with ice, that the boats ran but irregularly. On the third day of December, 1869, a vessel loaded with oil took fire opposite the Tompkinsville dock and burned for a week before she sank. There was a vessel before this, loaded with cotton, burned in nearly the same place.

Mr. Olliff collected the fare of the passengers on the Sunday that the Westfield blew up, when so many were killed and wounded.

* * *

Copy of advertisement taken from New York *Herald* of July 17th, 1835 :

Pleasant Excursion and Fares Reduced !
For

Staten Island, Tompkinsville, Mount Pavilion, Planters' Hotel and Bay House at Tompkins & Staple's Ferry, near the Narrows.

The Steamboats Hercules and Bolivar will run alternately from New York and Staten Island.

Leave Staten Island.			Lv. Whitehall Dock, N. Y.		
At	7 o'clock	A. M.	At	7 o'clock	A. M.
8	"	"	8	"	"
9½	"	"	10	"	"
11	"	"	11	"	"
1	"	P. M.	12	"	M.
2	"	"	2	"	P. M.
3	"	"	3	"	"
4	"	"	4	"	"
6	"	"	5	"	"
7	"	"	7	"	"

Fare 12 and a half cents, each way—children under 12 years, half price.

N. B.—This affords an opportunity to inhale the sea breeze.

All goods and baggage at the risk of the owners thereof.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

October, 14, 1898.

Meeting called to order at 8.20 o'clock, at the residence of Mr. Wm. T. Davis, New Brighton. The president in the chair.

Messrs D. R. Norvel and T. H. Bergen were elected active members.

The secretary announced that the customary field day, with the Torrey Botanical Club of New York, would be held as usual on Election day, with Erastina as the starting point, on the arrival of the train which meets the 9.20 boat from New York.

A paper by Dr. F. Hollick on "The Old Quarantine. Its destruction and the causes which led to it" was read, and will be published as a special number of the Proceedings.

Mr. Walter C. Kerr exhibited a drawing recording the performance of an exotic plant in captivity and read the following paper on

PLANT INTELLIGENCE:

The tendency of plants, as well as animals, to follow the habits of their ancestors is too well known to invite explanation, but the effort of a specimen of *Eichornia crassipes* to maintain its habit under serious disadvantage, comes quite as near intelligence as plants are permitted to approach.

On September 10th this South American Pond Weed, one of the plants mentioned in our last Proceedings as having been found in a pond near the Moravian Cemetery, consisting of nine bulbous stems and one scape bearing a handsome spike of blue flowers, was placed in a glass jar, four inches in diameter and five inches high, filled with

water. The feathery roots completely filled the jar, which was much too small for the plant. The flowers faded rapidly and in a few days the scape began to bend downward to place the seeds under water—a habit which is shared by our native Arrow Arum (*Peltandra undulata*).

By September 17th, the scape, which was six inches long, projected horizontally over the edge of the glass, directly toward the light of a neighboring window, and bent downward a distance of three inches.

On September 18th, when about to exchange the jar for a larger one, to give the scape room to enter the water, it was noticed that it had revolved about the horizontal part, lifting the drooping end half way up to the rim—the scape itself did not twist, but made a short bend just above the base, rupturing the thin sheath inclosing it. By September 24th the end had risen to the rim, the entire scape then being horizontal and the outer half inclining inward at an angle of 45 degrees with the inner half. This inward bending indicated great effort, for the curve was sharp and the concave side slightly wrinkled, evidencing that the force was probably due to cellular elongation on the convex side.

While the first bending of the scape was toward the light this second turn was away from it; the common light-seeking proclivity seeming overpowered by the necessity of reaching the adjacent water in which to submerge the fruit.

Further progress was impeded by a large bulbous stem which was removed on September 25th and the faded corolla

was clipped off to prevent its sticking to the glass. This disturbance caused the end to settle a quarter of an inch, but on September 26th it rose again and lifted a small leaf, which had developed, over the rim.

On September 27th, the end pushed entirely over the edge of the jar and into the water. In this effort the entire plant was moved from its central position in the jar, against the resistance offered by the crowded condition of the roots.

On September 28th no change was observed, the end remaining against the inside of the glass and about half an inch under the surface of the water. The weather turned cold, and on September 29th the outer half of the scape withered, yielding first on the convex side of the sharp bend where the cells may have been weakened by expansion.

It will be noted that when the scape bent downward, as far as possible without finding water, it did not immediately develop a plan of relief, but an entire week elapsed before its new action started. It did not proceed with that promptness which would have been expected in exercising a function common to its ancestors. It rather seems to have met a new condition entirely foreign to past environment, which it mastered very well.

Mr. Thos. Craig showed specimens of *Salvinia natans* (L.) All. and read the following paper :

SALVINIA NATANS ON STATEN ISLAND.

This plant has been found on Staten Island in two places. The first find was in a pond north of the Moravian cemetery growing with some other water plants mentioned in our previous Proceedings, which came from a warmer climate—evidently introduced by a good Samaritan for the mystification and delight of those who have a hobby in hunting for animal and plant life in the deep recesses of the woods.

In Silver Lake, where the second find was made, there did not appear to be design in the planting, but no doubt some one did it as it was scarcely possible that

so conspicuous a plant could have previously evaded the many hunters of pond life in that lake.

In none of the specimens collected was there any evidence of the growth of sporocarps so far as the writer could see. It is evident of course that if the plant does not produce what may be called its seeds in this climate, that the effort to enrich our local flora will be defeated.

The only authentic instance of the finding of the plant in the northern part of the United States is recorded in the Bulletin of the Torrey Botanical Club, Vol. 18, page 13, where it is described as having been found in Minnesota.

In Bennett & Murray's *Cryptogamic Botany*, page 23, is a figure of the plant said to be natural size. This shows a plant with much larger leaves than the plant found on the island. Mr. Conway McMillan noticed the same thing in his Minnesota specimen and attributed the probable cause to the time of collection being so late. Would it not be a better explanation to suppose that the smaller size is the result of having been kept in confinement. All who have attempted to keep Alga and other water plants in tanks know that they become dwarfed.

Salvinia natans cannot be said to be a naturalized American yet. The attempt to naturalize it on this island will be watched next year with much interest.

Mr. Wm. T. Davis exhibited mounted specimens of plants, new or rare to the local flora, with the following notes on the same :

BOTANICAL NOTES. (Additions to the Flora)

Nymphaea advena, Ait. var. *minus*, Morong. A few plants found in Bull's Head pond; collected by John V. Leng.

Acer platanoides L., growing spontaneously in New Brighton. Many trees also growing along a wall on Todt Hill.

Phaseolus polystachyus, L. Abundant on Richmond Hill along the side of Meissner avenue.

Physocarpa opulifolia, L. Escaped in several places on the side of Todt Hill.

Philadelphus coronarius, L. A considerable number of escaped bushes on the

side of Todt Hill.

(New Localities.)

Acer saccharum Marsh. Sugar maple. Common in the woods between Willow Brook and New Springville; also north of the Moravian cemetery.

Tilia Americana, L. Woods between New Springville and Willow Brook.

Amorpha fruticosa, L. Both sides of Egbertville road near Meissner avenue.

Tiedemannia rigida, L. Old Place, along the edge of the meadows.

Houstonia cærulea, L. In the fields both sides of Bradley's road at the Turnpike.

Sericocarpus linifolius, L. Watchogue.

Cynoglossum officinale, L. Not uncommon during the past summer on the rail road embankment west of Arlington station. Heretofore but two plants have been reported from the island.

Ipomœa pandurata, L. Found by Messrs. Beutenmuller, Uhlenhaut and myself growing with a trumpet vine in a sandy field at Mariners' Harbor.

Alnus glutinosa, Willd. Common along Egbertville road north of Meissner avenue; also by the old mill on Stony Brook.

Populus heterophylla, L. Not uncommon at Huguenot in several of the small swamps that lie near the shore; also along Huguenot brook. This is the third distinct station for the tree on the island.

Tradescantia Virginica, L. Rail road embankment to the west of Arlington station.

Pinus echinata Mill. Woods between Oakwood and Richmond Valley, associated with the post oak.

Mr. Arthur Hollick read the following memorandum upon.

STATEN ISLAND GEOLOGY AT THE WORLD'S FAIR.

On a recent visit to the World's Fair I had an opportunity to examine the material contributed by Staten Island to the New York Mineral exhibit. This material, consisting of clays, kaolins, sands, gravels and trap rock, was described by me shortly after having been collected (See Proceedings for Dec. 17th,

1892, and May 13th, 1893) and it may safely be said that it contributes not a little to the fine exhibit in economic geology made by our State. This exhibit is not one which appeals to the superficial observer, but it is an excellent demonstration of our resources in building stones, clays, petroleum, salt, etc. It has received warm praise from those who are competent to pass judgment and we may with perfect justice claim a share of the credit for this praise, as no county in the State is more fully represented than our own.

I quote as follows, from an article entitled "Notes on the State Exhibits in the Mines and Mining Building at the World's Columbian Exposition, Chicago," by R. A. F. Penrose, Jr., in the Journal of Geology, vol. I. pp. 457-470: "The State exhibits should fairly and honestly represent the mining industry within their borders, giving undue prominence to no one product, and neglecting nothing that could be represented. * * * Among the best American exhibits are, beginning with the Eastern States, those of Massachusetts, New York, Pennsylvania * * * The New York exhibit is the first one we find which is representative of great economic importance. It displays its clays, sands, iron ores, building stones, petroleum, salt, etc., in a thoroughly systematic and creditable manner and gives a very good idea of the relative importance of the different products."

Mr. Hollick stated that his attention was recently called to a plant which was being sold under some fanciful name, in the streets of New York, with the assurance that it came from California and possessed a very delicate and lasting odor. An examination at once showed it to be our common salt marsh samphire (*Salicornia Virginica*, L.) and whatever odor it possessed must have been imparted to it by steeping in some strong perfume. It doubtless found as ready a sale as did the corky branches of our common sweet gum tree, (*Liquidambar Styraciflua*, L.), some years since, under the name of "Florida alligator wood".

The president appointed Mr. Georges Depuy to edit the current proceedings.

Adjourned at 10.15 o'clock.

PROCEEDINGS

— OF THE —

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

Special No. 16.

October, 1893.

THE OLD QUARANTINE. ITS DESTRUCTION AND THE CAUSES WHICH LED TO IT.

BY DR. F. HOLLICK.

During the nights of September 1st and 2d, 1858, the New York State Quarantine buildings, then located at Tompkinsville, were burned by the citizens of Staten Island. The principal actors in the affair have mostly passed away and the events themselves have become either forgotten or oftentimes distorted by hearsay or prejudice.

Now, after a lapse of over thirty-five years, the passions of that period have vanished and it becomes possible to write a fair and impartial account of the affair and the causes which rendered it necessary, without danger of being misconstrued or of hurting the feelings or arousing the resentment of any one.

PART I.

The old quarantine on Staten Island was destroyed because it had become a pestiferous local nuisance, and a constant menace to the health of New York City and the whole surrounding country. Petition after petition had been sent to the Legislature for its removal but no attention was paid to them, because so many were interested in keeping it where it was, regardless of the public welfare. It was commonly spoken of as "a pleasant pauper home for broken down politicians," and was in fact worked as part of the political machine, and contributed largely to the campaign funds.

The management, for the most part, was scandalous so far as taking pre-

cautions against infection went. The men working on infected ships, and those employed about the sick, were all the time in and out of the village, and associating with the people everywhere. They were to be met with on the ferryboats, and even in New York City. The consequence was that whatever contagious disease was in the Quarantine soon found its way outside. On three several occasions yellow fever broke out on the island, from this easy intercourse with Quarantine and all the inhabitants, who could, fled for their lives, so that the place was almost deserted. I went with my family on two occasions to New York City, and stayed there until the danger was over, but many could not get away, and of these several died of the disease. The danger of course kept increasing, for in spite of the nuisance the population increased, and communication with the city became more close and frequent. But nothing could overcome the power of vested interests, and the citizens at last came to the conclusion that they must effect their own salvation.

The Quarantine grounds occupied the whole space now bounded by Arietta street, Hyatt street and Tompkins avenue, down to the water. There were no docks to mar the view, and the whole place looked very beautiful from the water, having some fine trees, well kept lawns and gardens and fairly good looking buildings. It was well kept, and no doubt those who had quarters there found it a very desirable residence. In theory those inside were isolated, kept inside, especially when there was much sickness, but in practice the greatest

laxity prevailed. The wall went all round, including also the Light House grounds, and there was but one public place of entry and exit, the same that now stands at the bottom of Arietta street, leading to the cotton docks. A gate keeper kept watch and ward there night and day, but there was constant going in and out. The ferry to New York was close by, and people from out of quarantine came on board the boats and mixed with the other passengers all the time. In fact the establishment was only a part of the village of Tompkins ville. A number of men were employed inside, especially when there were many ships coming in, and as the pay was extra, and the living good, there were always plenty trying to get it, and as it is in all public service influence carried the day. It was easy to scale the wall from the inside and go into the village at night for a spree or to visit friends, and it was done all the time. The gate keeper was a so said to be amenable to pecuniary influences; and for a consideration often let out or in those who could pay. A man who worked in my garden, after much trying, got a place in the quarantine and left me, but one evening some time after I met him outside taking a walk, "why Mike," said I, "how did you manage to get out?" "Oh," said Mike, "there's no trouble about getting out, the only trouble is to get in." In this way disease was often spread over the island, and even taken to the city. All quarantined ships were then anchored opposite where the cotton docks now are, and the ferry boats passed through them in their trips. From these ships, which were all sailers then, there was constantly thrown over board all the refuse of every kind, and the shore was constantly strewn with old beds, on which perhaps sick people had lain; foul clothes, dirty vessels, and filth of every kind.

Those who see steerage passengers only in steamers, as we now have them, can form no idea of what they were when packed by hundreds in tiers of bunks, down in the holds of sailing ships. Each

party brought its own provisions, which they cooked as best they could, at a galley on deck, and tin bottles of water were given out each day, a gallon to serve so many people, for all purposes. It can be imagined perhaps what this led to when the hatches had to be shut down, in bad weather, and this seething mass of humanity and decaying provisions left for days and nights together in almost totally unventilated darkness, for lights were too dangerous to be allowed under such conditions. Some of these voyages lasted six week, or even longer, and the state, both of the people and of the ships was simply horrible. On many of them a disease broke out called ship fever, of which hundreds died, both on board, in the quarantine hospitals, and in the village. Even yellow fever ships were often among the rest, or close by, and one of these caused an outbreak of the disease which I well remember. The vessel was anchored opposite Stapleton, and one afternoon there suddenly arose a most dreadful stench, which was smelt all over the village, and made everyone feel sick. They were pumping out the bilge water, which seemed to be the very essence of everything abominable and pestiferous. An old sea captain who lived by me remarked at once "that's a yellow fever stink," and so it turned out, for many sickened at once, and two of my immediate neighbors died from it. Instances of a similar kind were constantly occurring, and it may readily be conceived in what a state of apprehension everybody lived, the danger was ever present, and yet no appeals would be listened to for its removal. I remember one day seeing a commotion on the dock and people coming away, refusing to go on the boat because a gang of workmen had gone on board to go up to the City, who had just come from working on an infected ship. This may give some faint idea of the dreadful condition of affairs in the Quarantine which led to its destruction. It was not burnt by a mob, in a riot, but deliberately and orderly, by responsible citizens, who were never afraid nor ashamed to admit what they had done. It was the only way in which a great public danger,

every day becoming more serious, could be removed.

Meetings were called at which resolutions were passed denouncing the abuse and calling upon the local board of health to take such measures as might be needed for the public safety. They did so, and called upon the citizens to come, as citizens, and abate the nuisance. It was understood that the assembly for this purpose would take place in the old fort, on Fort Hill, which was then covered with trees, on one of which hung a red lantern, around which the meeting gathered; a chairman was appointed and a communication was read from the board of health declaring the nuisance no longer bearable, and directing its removal. This was sufficient, and the work was immediately begun.

Two days before a cart drove up to my house on Fort Hill and dumped down by the side fence a load of bundles of straw and some boxes filled with bottles of camphine and boxes of matches. When the meeting dispersed a number of the best known citizens took each a bundle of straw, a box of matches and a bottle of camphine, and away they marched down the hill. At that time there was no way to reach the upper end of the quarantine ground (at the top of Hyatt street) but by going round by Tompkinsville or New Brighton, as there was no public road across the Westervelt place, which lay between, and this upper corner was the only unguarded point. To go round either way would have made all known, and resistance would have been prepared. Dr. Westervelt had a private road across his land, beginning at the top of the present Horton's row, and ending in the present Fort place, with a gate at each end, and that night both gates were left open so that the procession of men with their bundles of straw went straight across unseen by any one, and came out just where they wished, at the corner opposite the church. The whole quarantine ground was surrounded by a high brick wall, of which a portion is still left at the bottom of Hyatt street on one side of the Light House grounds. This wall would have been a great impediment, for it was too high to get over; especially with a bundle of straw on your back, a bottle of camphine in your pocket, and a box of matches. But the day before some one had dumped at that corner a load of wooden beams with handles to them, so that half a dozen men on each side could take one and use it as a battering ram, which in fact they did, and soon had enough of the wall demolished to let in all who choose to enter. The place was soon well filled, and the

work began, but the officials and employes were at once on the alert and not a few shots were heard, but the resistance was soon seen to be hopeless and given up. There were numerous buildings about the place, many unoccupied, and these were soon on fire. The large men's hospital, with a large wooden statue of a sailor on top, was the next, after it had been cleared of every living thing, even to a cat and a canary bird. There were I believe only three yellow fever patients, and these were carefully carried out and placed on beds under an open shed, for it was a very warm night, and they laid enjoying the scene, and being well attended to. I believe they all recovered and no one was taken sick from being in contact with them. I heard it said afterwards that being carried out into the open air probably saved their lives.

This was all that was done the first night, and it was thought this would be sufficient warning to the State officials to set about removing the establishment, but the next day we heard they were going to send down a guard, and re-erect the hospital. On the next night another meeting was held, in the Quarantine grounds, and the other buildings one after another were also set on fire, after seeing that no one was in them. One of these was used as a hotel, where the Doctor boarded patients, after they had stood quarantine, till he decided it was safe to let them go, and a good thing he was said to make of it privately. The boarders when they saw us come the second night all had their trunks packed, and were ready for flight, glad enough to escape. So thoroughly was the work done on this second night that but little remained for another, and when all was over police and soldiers were sent down to guard the ruins. There was no concealment about the act, and all was done orderly and under sanction of law. It was simply a question of leaving this terrible pest house where it was till some great public calamity occurred, or of abating it as we did, for there was no other way. Had it been left to legislative action nothing would have been done till New York City had suffered from a fearful visitation.

PART II.

The preliminary meetings, before the board of health was called upon, were held at my house on Fort Hill, and at that of Mr. Ray Tompkins, my next door neighbor. We took legal advice, and raised money to carry on the war, for much had to be done. I subscribed myself one hundred dollars. Nothing was done rashly, and the board of health would not move till assured that they had legal sanction for what they did.

The place where the red lantern was hung, and the final meeting held, was on the very spot where the reservoir now is, and my house was exactly opposite, in Third avenue. There were then no houses thereabout except the few in Third avenue, and no streets, in either direction, between Westervelt avenue and Monroe avenue, all that space being Dr. Westervelt's farm. The old Westervelt mansion stood where Mr. Benziger's house now is, and had a row of large pillars in front, supporting a colonade. As the procession of men with their bundles of straw passed in front of the house it was quite dark, and nothing stirred, but I saw the glimmer of a segar behind one of the pillars, and heard a low cough, which was responded to by the leaders. The outer gate was wide open.

A former employé in the quarantine, who then kept a liquor store down by the dock, volunteered to get into the grounds as soon as it was dark, which he did, being helped over the wall. He went all about, and brought word back that all was quiet, and few people there. We had previously got to know all about the number and location of the sick. One of the first men I met inside was Dr. Theo. Walser, with an old musket in his hands, bravely threatening every one he met, and doing his duty manfully in defence of the place, but I never heard that the good doctor either killed or wounded anybody. As soon as the fire was well under way the old bell which hung in the grounds was rung for all it was worth, to call as many people there as possible, and they were there in force, even from as far as Richmond. The bell clanging brought out the fire engines, and the firemen insisted upon being admitted to the grounds, to help put out the fire, but the gate keeper refused to open the gate, and they could not get in with the engine any other way. There was a great crowd with the firemen, and he knew well they were better outside than in, so far as the fire was concerned. Finally the hook and ladder was hooked on to the gate, the crowd took hold, and with a rush down came the gate, and in rushed the crowd. It was then found that the hose was cut, and the engines were idle, but the crowd was not. In tearing down the gate part of the cap stone of one of the pillars was broken, as may be seen to-day. The gate keeper's house was burnt down along with the others, as was also a row at the top of Arrietta street. These fronted on the street, but their back doors opened into the quarantine grounds, and in them lived

many of the employes. Dr. Walser and his family lived in one of the lower ones.

After all was destroyed the wall was rebuilt, and a number of temporary buildings were erected in which the quarantine was carried on after a fashion, till removed to Princes Bay, where the residents burned it down again. After that there was a floating hospital, the "Florence Nightingale," and finally the islands were made in the lower bay.

When the wall was put up again a board platform was built on the top on which sentinels paced night and day, and a number of the state militia regiments took turns as garrisons, being housed in the grounds in quarters built for them, and a roaring time they had. The place was under strict martial law, and no one was allowed to approach that wall. All kinds of stories were told as to the continued belligerence of the citizens, but the fact is they looked on the whole performance as a farce, which it was. One sentinel said he was shot at, and showed a bullet hole on each side of his hat, where he said it had gone through, but being asked if it was on his head at the time he said, of course, and it was then shown that the bullet must have gone clean through his head. On another occasion the soldiers shot an old cow, which was supposed in the dark to be a Staten Island quarantine burner. On the whole we got along very well with the boys in uniform, and many regretted when they left.

While the burning was going on a body of U. S. marines came down, but the officer in command told us that his orders were strictly to guard only the federal property, in the light-house grounds, and there they remained till all was quiet.

Such is a rambling reminiscence of the great event, for Staten Island, the burning of Quarantine. Had that establishment never been located there the island would have always been a much more attractive place. It was a terrible evil, and did immense injury. Dire threats were heard of what would be done to the well-known actors in the affair, and we were all prepared with bondsmen in case of arrest, but nothing came of it. All kinds of tales were told as to the riotous conduct of the Staten Islanders, and their brutality to the sick, especially by those who had been ousted out of pleasant and profitable places, but those acquainted with the real facts knew them to be false, and it is for the purpose of putting upon record the truth that I have penned these few lines, so that the citizens of to-day may know that their predecessors were not the savages some represented them to be.

PROCEEDINGS
OF THE
NATURAL SCIENCE ASSOCIATION
OF
STATEN ISLAND.

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NEW BRIGHTON, N. Y.,

1895.

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VOL. IV. No. I. Nov. 11th, 1893.

Annual Meeting.
Meeting held at the residence of Mr. Walter C. Kerr, Tompkins avenue, New Brighton. The president in the chair. Eight members and three visitors present.

Reports of officers for the past year were read and approved as follows:

Treasurer.

Balance, at date of last annual report	\$124 39
Receipts.	113 50
	<hr/>
	\$237 89
Disbursements	\$99 16
Balance on hand	138 73

Secretary.
No. of active members at date of last annual meeting 36
Since elected 14
Resigned and dropped 4
Leaving, at date 46
Ten regular meetings were held, and ten regular numbers of Proceedings, containing 29 pages, and four special numbers, containing 16 pages, were issued.

Curator.

No. of additions to the collections .	12
No. of specimens included in above .	44
Classified as:	
Geological	20
Botanical	15
Archæological	3
Miscellaneous	6
No of additions to the library . .	171
Classified as:	
Exchanges	122
Donations	33
Subscription	16

The election of officers for the ensuing year resulted as follows:

President, Walter C. Kerr; treasurer, Thomas Craig; secretary, Arthur Hollick; curator, Jos. C. Thompson; trustee, to fill the vacancy caused by the consolidation of the offices of recording and corresponding secretary, Wm. T. Davis.

The following named persons were elected active members: Dr. C. W. Townsend, New Brighton; H. L. Beadel, New Brighton; H. W. Congdon, New Brighton; A K. Johnston, Prince's Bay.

On motion the second Saturday evening of each month was designated as the time for holding the regular meetings of the Association during the ensuing year.

The president appointed Mr. Wm. T. Davis to attend to the mailing, etc., of the Proceedings for the ensuing year and Mr. Jos. C. Thompson to edit the current issue.

Mr. Wm. T. Davis referred to the recent death of Dr. A. L. Carroll, formerly president of the Association for several years, and suggested that some appropriate action be taken. Mr. Arthur Hollick also referred to the same matter and the following was ordered spread upon the minutes:

Alfred Ludlow Carroll, M. D., died in New York City, Monday, Oct. 30th, 1893. The branches of active work in which he was most widely known were those of medicine and sanitation, in which his reputation assures that his memory will be appropriately honored by those who were associated with him in such connection.

We of the Natural Science Association knew him best as one of the original fourteen persons who met on the 12th of November, 1881, just twelve years ago, and formed the nucleus of our

present Association. He was one of the first to help organize our somewhat uncertain footsteps, having been elected our president in 1882, and re-elected for five successive years. In 1889 his removal from the Island severed his connection with us. His advice and financial assistance were a strong dependence, and it is largely due to his interest and support during our early years that we owe our present existence and prosperity.

Mr. Wm. T. Davis exhibited specimens of *Anodonta fluviatilis*, Lea, and read the following memorandum:

REDISCOVERY OF ANODONTA FLUVIATILIS ON STATEN ISLAND.

During the past summer *Anodonta fluviatilis* was found in the Bull's Head pond. Only empty shells were discovered, chiefly such as had been opened and the contents eaten by muskrats. Mr. Sanderson Smith has informed me that, as far as he remembers, the specimens admitted into the list of fresh and salt water shells of the Island, originally published in the Annals of the New York Lyceum of Natural History, in May, 1865, and subsequently republished with a few changes, in our Proceedings, as Extra No. 5, March, 1887, came from the ponds near Clifton. None have been reported in many years, so the present specimens from Bull's Head are worthy of being placed on record.

Mr. Arthur Hollick exhibited specimens of drift boulders, containing fossils, from Prince's Bay, and read the following memorandum:

A RECENT FIND OF DRIFT FOSSILS AT PRINCE'S BAY.

On the 29th of last month, while examining the Drift rocks at the base of the Prince's Bay bluff, I found four boulders containing fossils, representing four different geological horizons, viz.: Hudson shale, with *Orthis*, probably *O. testudinaria*, Dal; Helderberg limestone, with *Strophodonta Becki*, Hall, *S. varistriata* Conr. *Strophomena rhomboïdalis* Wahl. and *Orthis oblata*, Hall; Oriskany sandstone, with *Spirifera arrecta*, Hall; Schoharie grit, with *Atrypa reticularis*, L. and five specimens of some Bryozoön not determined. By far the larger part of the boulders was left behind and will receive further attention on

some future occasion. These do not add any new species to our already published lists of Drift fossils, except in the case of the provisionally determined *Strophodonta varistriata*, but the discovery, in one day, in a very limited area, of four fossiliferous boulders, representing as many different geological horizons, is perhaps worthy of note.

Mr. Hollick suggested that a record should be kept, as far as possible, of all literature relating to Staten Island, and that it should be indexed by title and reference in the Proceedings. Such articles, often of interest and value, have been published in various places, but they are so scattered that they have become forgotten and practically lost. As a beginning in this connection the following was presented:

RECENT LITERATURE RELATING TO STATEN ISLAND.

Sketches of the Vegetation at the Lower Course of the Hudson.

(Hugo von Rabenau in Trans. Nat. Hist. Soc. of Görlitz, vol. xx. (1893) pp. 1-38.)

In this contribution the author devotes about twenty-five pages to a description of the flora of Staten Island, with incidental references to its history, physiography, topography, scenery and inhabitants.

It is evident that he has done considerable tramping and has used his eyes to good advantage, and an excellent general description of our flora is the result, nearly all of our most prominent plants, with notes on their localities, being given. He is not pleased with the change which has taken place in the vicinity of South Beach during recent years, which was formerly one of his collecting grounds, and he thus speaks of this portion of our Island: * * * "South Beach, a bathing place, first known as such four years ago, but which has become, on the part of New Yorkers, a place of not altogether good repute. When I wrote my first contribution (p. 263, vol. xix.) I thought of this spot; it consisted of silent dunes with collections of trash and dirt, from dumpings of the

New York street cleaning department, floating carcasses, ruined shanties and stranded vessels. To day we find there a parallel to the opposite shores of Coney Island, with its tingle-tangle shows, hippodromes and theatres, dance saloons and innumerable drinking places. Russian swings and toboggan slides, lightning photograph and shooting galleries, Frankfort sausages and sauer-kraut, Plattdeutscher Tyrolese and banjo-twang ing negroes. Everything is wonderful in its capacity for noise. * * * * But here is the Eldorado of pleasure for the lower strata of Manhattan's population, which appears to spew forth down here its proletariat masses every Sunday; the cheapness of the fare, 20 cents excursion from New York, keeps pace with the quality of the usual visitors to this bathing place."

This is rather a severe but painfully realistic picture to begin with, but he makes up for it afterwards by his enthusiasm over the incomparably beautiful view from the hill back of Stapleton and the "crystal clear oval of Silver Lake which shimmers from between the green leaves and yellow and white blossoms of the pond lilies, *Nuphar advena*, Ait. and *Nymphaea odorata*, Ait." He also mentions the fact that *Brasenia peltata*, Pursh, is found there, notes other localities where it is known in different parts of the world and calls attention to the slimy masses which cover the stems and under surfaces of the leaves.

He mentions the rich flora of the Clove valley, not neglecting *Azolla Caroliniana*, introduced there by our fellow member Mr. Samuel Henshaw in 1885, and then climbing over Ocean Terrace, past the iron mines, mentions the quantities of *Cerastium arvense*, L. var. *oblongifolium*, *Arabis lyrata*, L., *Houstonia carulea*, L. *Viola pedata* L., and *Clematis ochroleuca*, Ait. He next follows the south side from New Dorp and Garretsons to Tottenville.

He also speaks of visiting Erastina, at the time of Buffalo Bill's Wild West show, and gives an excellent account of the flora of that vicinity, over which he waxes most enthusiastic and declares it to be the

botanical garden of Staten Island.

The previous communication, to which he refers, may be found in this same publication, a year previous. (vol. xix., pp. 259-264.)

The president then delivered his annual address, as follows:

ANNUAL ADDRESS OF THE PRESIDENT.

As we enter another year—the twelfth of our Association—we may profitably review our efforts and glance at our prospects.

The last address by the president having been made at the annual meeting in 1891, it may be appropriate to consider the work of the past two years.

During the year ending with November, 1892, our meetings continued to be held in the New Brighton Village Hall, where, notwithstanding the limited attendance, our proceedings gathered into permanent record much worthy of note. Among the prominent contributions were:

The investigation of our trap dykes
The fossil remains in our Cretaceous clays. The fossils of our Drift boulders
The tides of New York Harbor. The discovery of the new hybrid *Quercus Brittoni*, and its addition to science. The addition of 39 species to our Cretaceous flora, 14 being new to science, besides numerous additions to our living flora and the usual fund of miscellaneous notes. In all a prosperous year, as measured by results.

Of the year beginning with November, 1892, and closing to-night, I am permitted more especially to speak, as it has been full of enthusiasm, its meetings generously attended and its published proceedings exceeding those of any previous year; leading to the generally conceded fact that the Association has never been more prosperous. This condition has resulted not from any one cause but several. The attendance at our meetings has undoubtedly been largely augmented by our policy of gathering in private houses. The contributions to our proceedings have been varied and extended by the new zeal which each member has spontaneously

contributed, while the large increase of membership has followed from the presence of new residents and the personal activity of our members.

Among the minor results of this prosperity may be mentioned the conclusion to index our proceedings to this date, forming the third volume and to begin the fourth with paged sheets and titled contributions, printed on appropriately heavy paper.

Among the more important publications of the year, may be found:

The finding of a specimen of European furze. Woodpeckers and *Cecrop* cocoons. Peculiar appendages in berries of *Smilax rotundifolia*. The disintegration of rocks by algae. Random thoughts on local landmarks. The addition of eight species of butterflies. Indian rubbing stones. The addition of seven species to our flora. The profuse adventitious budding of a horse chestnut. The old Britton house. The influence of the past winter on the high water shrub. Local notes on the opossum and red fox. Notes on the geology of the new railroad cut at Arrochar. The storms of August 24th and 29th. Triassic sandstone drift containing *Equisetum*. The finding of a live *Littorina littoria*. Indian graves at Tottenville. The old hotels of Staten Island. Plant intelligence. The old Quarantine. *Salvinia natans* on Staten Island, and an unusual number of notes on many topics.

In the exhibits of the natural resources of the State of New York at the World's Columbian exposition, our island was well represented by material secured through members of this Association. Such contributions included eleven specimens of clays and sands, while twenty of our trees were utilized as representative of their kind in the Forestry Exhibit—one species—*Pinus inops*—not being known elsewhere in the State, while another—*Populus heterophylla*—is only reported from three of our southern counties.

It has been frequently remarked that the uniform success of this Association in so small a community has depended upon

the diversification of its talent, thus maintaining an interest scarcely possible with too high a degree of specialization. At present the interest of our active membership is quite evenly divided between botany, geology, zoology, entomology, palæontology and local history, with a common interest in archæology and general science. Our constricted area of 59 square miles has been well gleaned with our coarsest rakes without disturbing the wealth of material remaining.

The contributions of our members must always be along the lines that pleasure and opportunity afford. Pleasure in this sense is a product of taste, while opportunity is another name for tramping. We are a natural science association, and nature lives outdoors.

Our proceedings must always be composed chiefly of brief notes—the results of our observations—rather than carefully prepared contributions or exhaustive investigations. It is urged that members more freely contribute such notes, as it is highly desirable that we accumulate material rather faster than we utilize it.

A pleasurable duty we should set for ourselves is the issuing of complete lists covering our various lines of investigation. To the privately published flora, which includes the vascular cryptogams, the addenda represent nearly one fourth of our 1320 species. The list of mosses is doubtless complete and our partial lists of fungi and diatomaceæ can be much strengthened by material now on hand. The only evidence that our marine algae have been gathered together is the unpublished manuscript, now six years old, while we have reason to believe that our fresh water algae and desmidiaceæ are available within reasonable time.

In zoology our mammalia, aves, reptilia, batrachia, lower crustacea, mollusca and rhizopoda are substantially complete, while our higher crustacea need only a few finishing touches.

In entomology our lepidoptera and coleoptera are scattered through several

volumes and much new material is in manuscript nearly ready for presentation. Our orthoptera are already ably listed by a member, though not as yet in our proceedings.

Our local geology merely needs re-writing in the light of twelve years of discovery since it was last so attractively issued.

In paleontology our Cretaceous fauna and flora are complete to date and with our Drift fossils are in ready and willing hands.

When could a better time arise than the present year to gather our strength together and after another summer for search and reassurance on any doubtful points, place in proof by another annual meeting a volume of proceedings that, under one cover, shall show our natural resources. Such a volume would be of real value and highly creditable to our Association.

There is no reason why we should not also within reasonable time gather our historical contributions together and with the additional matter yet unpublished issue a volume that shall be creditably complete. It might be appropriately prefaced by our rather meager archæology and concluded by the contributions on "Homestead Graves."

In general, publications of the fragmentary character common to monthly issues of local associations should be gleaned over about once each decade, and a volume issued that should largely enhance the value of the important matter by its systematic presentation.

A natural science association is a rather peculiarly organized body. It cannot claim to be a social organization, though not wanting in sociability, and it surely has no commercial aim. It is an assemblage of men who love knowledge for knowledge's own sake—who prosecute it for pleasure and who only incidentally come together on common ground for mutual exchange of thought

and the results of observation. The natural science is one thing, the association another. Such an association is not governed by the laws of business, limited by conventionalities of society or entwined by the sentiment of fraternal unions. Intimate friendships may and do arise therefrom, but they are personal and are not functions of the association. For these reasons, such bodies as we represent are likely to include greater diversity of tastes and peculiarities than are ordinarily found where men voluntarily assemble for special objects. It is the old adage of "birds of a feather" with special emphasis upon the singular number of the feather. For this reason it is especially appropriate in associations of this nature for each member to recognize this diversity, and by suppressing a fair half of his own desires and peculiarities, and looking charitably upon the half which his neighbor cannot efface, conduce to the dwelling together in unity, as is the condition of this association. Having seen much of internal dissension in other organizations, and the results, these few remarks are ventured now, at a time when there is no occasion for them, to express a strong desire that their pertinency be never permitted to arise.

In beginning a new year we would welcome our new members, especially inviting them to actively participate in the conversational discussions of our meetings and to contribute to our proceedings.

It is also our desire to add to our membership many residents, who though taking no active part, are interested in receiving our publications and who wish to thus indicate their approval of the work and objects of the Association.

With this review of our immediate past I would commit our present prosperity to the keeping of the immediate future and leave its results for record in our next annual address.

PROCEEDINGS

OF THE

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

VOL. IV. No. 2.

DEC. 9th, 1893.

Meeting held at the residence of Mr. Mark Samuels, Sylvaton Terrace, Rosebank. The president in the chair.

H. Cleaver Brown, New Brighton, and R. A. Parke, New Brighton, were elected active members.

Mr. Arthur Hollick exhibited specimens of galenite in calcite, stilbite, diabase, both hand specimens and thin sections for microscopic examination, asbestos, chromite and williamsite, and read the following

MINERALOGICAL NOTES:

I

On a recent trip to the upper trap quarry at Graniteville, in company with a party of students from Columbia College, several matters of interest were noted. The rock is much fractured, and along many of the fractures various minerals have formed. Calcite may be seen quite commonly, and while breaking away a piece of one of these calcite seams the specimen of galenite here shown was exposed. This is an addition to our native minerals, a though many years ago I remember seeing some which was found in a drift boulder, in Hamilton Park, New Brighton, and, in the absence of any Natural Science Association to teach the true significance of the find, there was considerable excitement occasioned and some talk of prospecting for a lead mine at that locality.

Unusually fine crystals of stilbite were also found, as a mat or coating on the faces of many of the fractures.

The trap exhibits evidences of alteration along these lines of fractures, due to the heat generated by the slipping of the rock faces against each other. A thin

section of the rock under the microscope shows it to be a typical diabase, consisting of a plagioclase feldspar and augite, with the mineral constituents much decomposed along the line of fracture.

Specimens from the same trap ridge but more coarsely crystalline in structure, collected near Lambert's lane, were subjected to examination by Mr. L. P. Gratacap and found to consist of plagioclase feldspar and hornblende, (See Proc. June 13, 1891, and Dec. 12, 1891), thus constituting it a diorite.

It would be interesting to continue the investigation at such other exposures as may be available.

II

Our serpentine area has received so much attention, and so many specimens have been gleaned from it and placed in our collection, that it might seem difficult to present anything new in the shape of either specimens or information, on the subject before this Association.

The variety of minerals found in connection with it attracted the attention of mineralogists many years ago. In the *American Journal of Science*, Vol. i (1818) pp. 54, 55, may be found the following extract from a letter written by Mr. Jas. Pierce to the editor:

"New York, May 18, 1818.

DEAR SIR:

I forward you specimens of straw and rose-coloured Amianthus I recently met with on Staten Island, which I detached in strips, from a rock; it not appearing, as is usual, in veins. It breaks up like flax, and may be spun and wove without the aid of moisture; and in respect to tenacity, flexibility, and length of fibre, it may be considered the best found in this country, and perhaps equal to any hitherto discovered. Staten-Is' and exhibits many minerals worthy of examination."

In regard to which the editor comments as follows :

"The specimens of amianthus, referred to in Mr. Pierce's communication, are uncommonly beautiful. The fibres measure 12 and 15 inches in length, and are as soft and flexible as fine human hair."

Louis G. Beck, in Nat. Hist. N. Y. Part iii. Mineralogy, (1842), p. 277, under Serpentine, and p. 305, under Hornblende, mentions the Quarantine locality. He includes our asbestos under the latter mineral and states that:

"As a locality of these varieties, this is one of the best in the United States, and is thought to be equal to any hitherto discovered."

Even at the present time, without very close search, specimens may be readily obtained which would be welcome in almost any collection of minerals away from Staten Island, and since the last meeting I have collected several to which I will call attention to-night.

The asbestos is the finest which I have ever seen from the Island and one specimen exhibits a beautiful double twist, like a letter S, due to slight faulting along a seam, which has pinched and bent, without fracturing, the fibres.

We have always taken it for granted that chromite is one of the minerals found in the soapstone, but beyond a few black specks occasionally noted, the evidence of its presence has been far from satisfactory. I am now able to show a mass weighing about a pound, which, with the other specimens, was found on Ward's Hill.

The other mineral is a fine sea green piece of serpentine, variety williamsite, a second addition to our list of native minerals. It was picked up on the surface of the ground, where new streets have recently been opened, on the eastern slope of Grymes Hill.

Mr. Hollick also exhibited again some of the drift material containing fossils, to which attention was called at the previous meeting and read the following note from Mr. L. P. Gratacap:

ADDITIONAL DETERMINATIONS OF SCHOHARIE FOSSILS FROM THE DRIFT.

The specimen of drift boulders sent to me by Mr. Hollick are referable to the

Schoharie grit and contain two fossils not recorded in our lists—*Neuleispira concinna*, Hall and *Meristella naruta*, Hall. There is, in addition, on one of the fragments, an impression which appears to be *Leptocælia* but which may prove to be the impression of a young *Strophodonta*. *Leptocælia* is not known in the Schoharie grit though it appears in the Upper Helderberg above it, and has been reported from Brazil in rocks coördinated with our Hamilton. There is nothing improbable in its occurrence at this horizon but it has not been hitherto seen there. It is here at the limit of its geological range, its appearance in later rocks being essentially sporadic and fugitive.

On one of these specimens can be plainly seen a coaly or graphitic spot, which is both highly interesting and problematical. It may be graptolitic or possibly vegetable. Its reference, in so unsatisfactory a condition, would be very questionable.

The bryozoön is apparently *Fenestella paraliela*, Hall.

Mr. Thos. Craig exhibited specimens of a *Wolffia* and read the following communication :

DISCOVERY OF WOLFFIA ON STATEN ISLAND.

I have to report having recently found on Staten Island, in the Old Town pond, what is said to be the smallest of flowering plants; a full grown specimen only measuring from one-eighth to one-half of an inch. I have not been able to ascertain who was the first to see this plant in flower, nor have I been able to see it myself after careful search with the microscope. Probably the specimens I have are past the flowering season. It is evident, however, that it does not depend entirely on its seed for increase. Like *Lemna*, to which it is closely allied, and which is so conspicuous on all our ponds, it propagates by budding, but unlike the other members of the family the bud immediately separates from the mother plant and becomes independent.

I submit a rough drawing to show this peculiar process, and the specimens may be examined under the microscope. According to the authorities there is a cleft on some part of the plant, out of which the young one grows. So far as I could see there is no appearance of a cleft or opening of any kind until the young plant inside has advanced in growth to a considerable size; then it appears to protrude, gradually increasing and enlarging the opening, until it finally emerges, leaving a vacancy in the mother plant the full size of the young plant. The opening does not seem to close up. What becomes of it remains for further study and examination to disclose.

Unfortunately there is very little literature on the subject. Only two species are described in Gray's Manual, viz.: *W. Columbiana*, Karst, and *W. Braziliensis*, Weddell—the latter differing from the former in having numerous brown spots over it.

Whether this specimen is *Columbiana* or *Braziliensis* I cannot positively say, but I think it is *Columbiana*. It is, how-

ever, plentifully covered with brown spots, but these are the points of attachment of a young alga which is growing on the plant, giving it, with transmitted light, under the microscope, a hairy appearance. Where the alga has dropped or has been rubbed off, a bright reddish brown disk remains. Anyone familiar with the growth of such algæ as attach themselves to objects in the water, will recognize by the appearance which these brown spots have that they are the points of attachment of an alga.

Dr. Britton informs me that *Wolffia* is recorded from Closter, Bergen Co., and Kaighn's Point, Camden, N. J., and Orange Co., N. Y., and we are now enabled to record it from Staten Island.

It has also been recently found by Dr. Bringham,* of Philadelphia, but he does not give the locality nor does he appear to know the name of the plant.

It will be observed that this plant has no root and that it is very loosely cellular and light green in color.

*The Aquarium, iii, 89.

PROCEEDINGS

OF THE

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

VOL. IV, No. 3.

JAN. 13th, 1894.

Meeting held at the residence of Mr. Georges Dupuy, Westervelt avenue, New Brighton. The president in the chair.

Wm. P. Heineken, West New Brighton, and W. J. Jenkins, Stapleton, were elected active members.

The secretary read an invitation to attend the funeral of the Rev. Samuel Lockwood, of Freehold, N. J. Also the following extract from a communication by Mr. Ira K. Morris, which was adopted as the sentiment of the meeting, ordered spread upon the minutes and a copy transmitted to the family of the deceased:

It is with profound sorrow that we learn of the death of Professor Samuel Lockwood, of Freehold, N. J., on Tuesday last. By this sad event our Association has lost a very warm friend, and we shall feel most keenly the absence of his kindly encouragement and intelligent criticism. For years past he was taken a deep interest in all our proceedings.

Mr. Wm. T. Davis exhibited specimens of and read the following paper on

STATEN ISLAND HARVEST FLIES.

Dr. Harris, writing of harvest flies, or locusts, in his "Insects Injurious to Vegetation," says of *Cicada canicularis*, Harris:

"During many years in succession, with only one or two exceptions, I have heard this insect on the 25th of July for the first time in the season, drumming in the trees, on some part of the day between the hours of ten in the morning and two in the afternoon. It is true that all do not muster on the same day; for at first they are few in number, and scattered at great distances from each other; new-comers, however, are added from day to day, till in a short time, almost every tree seems to have its musician, and the rolling of their

drums may be heard in every direction."

This *Cicada* is much less common on Staten Island than in Massachusetts, where Dr. Harris heard it sing so regularly on the 25th of July. It is plentiful, however, up the Hudson River, in northern New Jersey and in parts of Pennsylvania. On our Island its place is taken in point of numbers, by *Cicada tibicen*, L. (*C. pruinosa*, Say,) a larger insect with a much more impetuous song. The species first appears about the second week of July, and I have recorded its song in the past as follows:

July 15th, 1879.

" 17th, 1885.

" 12th, 1887.

" 14th, 1888. (Three individuals.)

" 9th, 1889.

" 9th, 1890.

" 11th, 1891.

" 11th, 1892.

Cicada tibicen, L., also sings after dark on warm nights, but it is a lazy, languid song, as if the insect were tired, and it totally lacks the impetuous vigor of the noon-day outburst. In the warm nights during the first part of August, 1887, it was no uncommon occurrence for this insect to give a short *z-ing*. Up to 8 P.M., they often sing, and I have heard a *Cicada* and a katy-did in adjoining trees. On Aug. 17th, 1888, long after the sun was down, they kept up their songs, each one desiring apparently, to be the last singer, for their voices are raised in envy and the males have no love for one another. They often sing while flying about a tree in wavy lines, and once I detected another *Cicada* fly out of a tree and join the singer.

It was no doubt a female.

They continue musical as late as the end of September, occasionally in considerable numbers. I have heard them as late as October 3rd, both in 1885 and 1886. In the first mentioned year, they were exceedingly plentiful. When singing loudly the abdomen vibrates quite fast, but gradually lessens as the song subsides.

The dry pupa shells of this insect may be found attached to the bark of a variety of isolated trees, upon the roots of which the larvæ have apparently fed. On the 26th of July, 1889, at eighteen minutes to 5 P.M., I saw a harvest fly come from its pupa case. The legs (tarsi excepted) the prothorax and folded wings, were of a grass green color, the wings being particularly bright. The eyes were also green, the ocelli golden and the mesothorax and abdomen of a brassy appearance. In twenty minutes the wings were of full size, but flimsy, bending with the breeze. The wings are held out flat, on the same plane with the dorsal surface, when drying, and the genitalia are protruded.

The third and largest species of *Cicada* that has been found on the Island is *C. marginata*, Say. The wings of a specimen, spread in the usual way, expand nearly five inches. This insect has also been taken at Yaphank, on Long Island, by Mr. A. C. Weeks; and Mr. Wm. H. Ashmead, who kindly examined my *Cicadas*, says that the insect occurs in Pennsylvania and about Washington. On our Island but one specimen has been found. It was discovered on a small post oak on a sand dune, near Mariners' Harbor, on July 19th, 1892, while Mr. Beutenmuller and I were looking for galls. It was late in the afternoon and the insect had evidently but a short time before emerged from the pupa-case, which we found at the base of the tree. In the same summer a second pupa-shell was found on a black-jack oak, growing in dry sandy ground at Watchogue.

The only other harvest-fly that has been collected on the Island is the red

eyed periodical *Cicada*, or "Seventeen year Locust," of which a more detailed account, in connection with this locality, will be given at some future meeting.

Mr. Thos. Craig read the following paper on

A NEW DICTYOSPHÆRIUM.

In Wolle's description of this genus he describes the cells as green, and egg or kidney shaped, united in a globose hollow family, involved in a gelatinous integument.

He describes four species: *D. Ehrenbergianum*, Naeg. *D. pulchellum*, Wood. *D. reniforme*, Bulnh, and *D. Hitchcockii*, Wolle. The one under consideration does not agree in description with any of the above species. It was found along with other algae, tangled in the roots of water cress in a pond in the woods back of the Moravian cemetery.

The beauty and regularity of the outline of this plant is remarkable. The accompanying sketch, for which I am indebted to Mr. Wm. T. Davis, only faintly gives an idea of it.

In size it is about .5 mm. in diameter, or smaller than the head of one of the smallest of pins.

The plant is enclosed in a globular envelope of transparent jelly, the outside of which is of a slight yellow tint, caused I presume by age or some staining material in the water. From a point in the centre of the globular mass sixteen faint silvery-like filaments radiate to near the circumference, where each filament is crowned with a cluster of twelve to fourteen fusiform, curved, bright green cells, each attached to the filament by one end. The cells, in length, are about five times the width. The cells are filled with a green material slightly granular and much condensed at the outer end. A well defined and large nucleus occupies the centre of each cell. The part of the cell nearest the filament is only faintly green.

Mr. Walter C. Kerr exhibited a carefully prepared drawing of the trunk of a red maple tree and read the following paper:

AERIAL ROOTS ON ACER RUBRUM, L.

Near the brook flowing from Logan's spring swamp east of Silver Lake stands a red maple, about fourteen inches in diameter, and on its north side the bark has been stripped, probably by splitting from a wound received while young, forming a bare triangular space extending nearly across the base of the tree and having its apex thirty-six inches from the ground. The wounded bark has healed and its edges are covered with a smooth, gray, corky layer presenting the rounded appearance common to the edges of such scars. The wood being uninjured remains in a good state of preservation while the entire tree is in vigorous growth.

It stands on a slight rise, about twenty-five feet south of the creek, in rich, rocky, moist ground, within eight feet of a low spot, which, though swampy in the wet seasons, is never overflowed.

The nearest trees are white oak and hop hornbeam, nine and fifteen feet distant, with no others within forty to fifty feet. Undergrowth is absent, and there is no reason to suppose that earth or stones have ever been heaped about it. Its branches twenty feet from the ground and thus there are no conditions of darkness or exceptional moisture to encourage the development of aerial roots.

About six inches below and to the right of the apex of the triangular wound there springs from the cambium of the healed bark two roots, each one-half inch in diameter. They extend downwards across the scar at an angle of about forty-five degrees; the upper being twelve inches and the lower seventeen inches long. They have decided root form and are covered with rootlets, the upper bearing about twenty and the lower about fifty.

The development of rootlets proceeds almost wholly from the lower surface of the roots, their length being from two to twelve inches, many being about six inches long, and all profusely branched, while from the upper surface only a few stunted rootlets rise, sparsely branched. The whole appearance of these roots

presents a strong contrast to the branches or young shoots of the red maple, leaving no doubt as to their character. Their tendency towards the earth is marked, though not reaching it by some eighteen inches.

What should cause these aerial roots is by no means evident, unless the scar has at some time been covered with a loose layer of bark, under which the roots have grown. They serve no purpose and it would seem as though they could scarcely survive. As they are now alive, it seems best not to molest them for the purpose of determining their exact character and mode of growth until after further development has been observed.

Mr. Arthur Hollick presented specimens of fossil leaves from Arrochar, with the following note:

A RECENT DISCOVERY OF FOSSIL LEAVES AT ARROCHAR.

The specimens were found at the junction of the Fingerboard Road and Sand Lane. They are contained in the characteristic ferruginous sandstone in which we have found so many of our cretaceous plant remains at Princes Bay and Tottenville. They are too poorly preserved for accurate identification, but are apparently no different from species found at these latter localities or in the clays at Kreischerville. Their chief interest is in the fact of their discovery at Arrochar, as the only other fossil leaf which we have from the same locality is the one found many years since by Mr. Gilman S. Stanton. (See Proceedings, Dec. 8th, 1888.)

MISCELLANEOUS MATERIAL, EXHIBITED.

Mr. L. P. Gratacap remarked upon a series of lower Helderberg and Hudson fossils, found in drift boulders by Mr. Hollick at Arrochar. They included finely preserved specimens of *Spirifera perlamellosa*, Hall; *Strophodonta Beckii*, Hall; *S. Woolworthiana*, Hall; *Strophomena rhomboidalis*, Wahl.; *Celospira concava*, Hall, and *Leptæna sericea*, Sower-

by, besides fragmentary remains of a *Pterinea* and bryozoöns.

Mr. Samuel Henshaw exhibited a number of old American and foreign copper coins, found during the removal of an old outhouse on his premises, Manor road, West New Brighton.

Mr. Thos. Craig desired that the fol-

lowing correction be noted in his article on *Wolffia* on p. 7 of the Proceedings for Dec. 9th, 1893: For "one-eighth to one half of an inch" read "one sixteenth to one-thirty-second of an inch."

The president designated Mr. Mark Samuel to edit the current number of the proceedings.

PROCEEDINGS

OF THE

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

VOL. IV. No. 4.

FEB. 10th, 1894.

Meeting held at the residence of Mr. Charles W. Leng, Columbia street, West New Brighton. In the absence of the president, Mr. A. K. Johnston was elected chairman *pro tem*.

Mr. Louis P. Gratacap presented the following list, prepared by Mr. A. Woodward and the Scott Stamp and Coin Co., of the copper coins exhibited at the last meeting, and found by Mr. Henshaw near his old stone dwelling on the Manor road.

U. S. Cent of 1818.

English half penny, George III, 1736.

Irish half penny, George II.

Irish half penny, George III, 1769.

Cut down farthing of Ireland, George III.

Farthing of George III.

Isle of Man half penny (Duke of Athol)

Quocumque Jeceris Stabit, 1758.

Danish Skilling, 1771?

Swedish 2 ore equal about 2¼ cents, 1765.

English half penny. Token money.

Mr. Wm. T. Davis exhibited specimens of the seventeen year locust found in various years since 1877, and read the following paper.

THE SEVENTEEN YEAR LOCUST ON STATEN ISLAND.

Our island will resound with the rattling song of the seventeen year Harvest fly or "Locust," during the latter part of next May and in the month of June, and it may not be uninteresting in view of the fact, to give a short account of the species in connection with this locality. It must be borne in mind that while *Cicada septendecim*, Linn. appears at intervals of seventeen years, its advent is

not in the same year in all of the middle states, or in all the counties of this State, but that there are separate broods or colonies, that emerge in great numbers in districts of varying extent, the limits of which are not sharp or well defined. Thus it happens that while there is a certain brood that appears periodically on our island, and attracts at such times general attention, there are also other years when the *Cicada* occurs in small numbers. At such times it will often be found that a brood is emerging not many miles away, and that the island lies within the outer margin of the territory.

This matter of distribution and much more regarding the seventeen year *Cicada*, and the more southern thirteen year form, has been recorded by Prof. Riley in Bulletin No. 8 of the U. S. Department of Agriculture, Division of Entomology. Prof. J. A. Lintner, New York State Entomologist, also gives, in his second annual report, the distribution of the *Cicada* in this state, noting five broods as occurring within its limits.

When Henry Thoreau resided on Staten Island in 1843, he wrote a letter, on July 7th, to his mother, in which he mentions the *Cicada*. He says: "Pray have you the Seventeen year locust in Concord? The air here is filled with their din. They come out of the ground at first in an imperfect state, and, crawling up the shrubs and plants, the perfect insect bursts out through the back. They are doing great damage to the fruit and forest trees. The latter are covered with dead twigs, which in the distance look like the blossoms of the chestnut. They bore every twig of last year's growth in

order to deposit their eggs in it. In a few weeks the eggs will be hatched, and the worms fall to the ground and enter it, and in 1860 make their appearance again. I conversed about their coming this season before they arrived. They do no injury to the leaves, but, beside boring the twigs, suck the sap for sustenance. Their din is heard by those who sail along the shore, from the distant woods, Phar-r-r-ah. Phar-r-r-ah. They are departing now. Dogs, cats and chickens subsist mainly upon them in some places."

In 1826 this *Cicada* appeared in great numbers on the island, as I have been informed by my grand-mother; in 1843 they came again, as recorded by Thoreau, and still again in 1860 and in 1877. In the latter year I saw many tree trunks and fences brown with their cast pupa skins, and the whirl of their flight and monotonous song, could be heard in every direction. Dr. Fitch, in 1855, wrote of the seventeen year *Cicada* and records this brood as inhabiting the valley of the Hudson river. Since his time, the various broods in different parts of the country, have been numbered for convenience, and the one inhabiting the valley of the Hudson and Staten Island, is known as No. XII.

During the visitation of 1877, I noticed that many of the *Cicadas* were affected by the singular fungus *Massospora cicadina*, Peck. While the insects were alive and walking about the fences and the tree trunks, if the abdomens of the infected individuals were suddenly jarred, they gave forth a cloud of innumerable spores. It has been stated that only injured specimens are attacked by this fungus, and then only toward the latter part of the season.

Since 1877, the seventeen year *Cicada* has not appeared on the Island in great numbers, and probably but few have been noticed except by those who have looked for them. The facts connected with their appearance, as far as known to me, may be arranged chronologically as follows:

1881, BROOD XVIII.

While collecting insects with Mr. Leng

in the neighborhood of Watchogue, we found a red-eyed *Cicada* pupa under a stone, and on the 5th of June, eight specimens were collected, many of them being wet, having but recently emerged. By the 12th of June, they had become quite numerous, and I counted about one tree near Silver Lake, fifty two pupa skins. The brood to which these insects belonged does not appear in great numbers in the east, but is mainly located in Wisconsin and neighboring states. Staten Island; Essex Co., New Jersey, and Germantown, Penn., were apparently, the only eastern localities from which the insect was reported in 1881.

1885, BROOD XXII.

I made special search this year for the Periodical *Cicada*, as one of the most widely extended broods known, was to make its appearance. On the western end of Long Island in the neighborhood of Brooklyn, they came in some numbers, and also sparingly in New Jersey, the main body in the east, however, occurring in Pennsylvania and thence southwestward.

On the Island the insects must have been quite scarce. Mr. Jas. Raymond and I, were walking along a wood-path in the Clove Valley on the 4th of July, when he found a wing that probably some bird had pulled off of a red-eyed *Cicada*, as they so often do. To those who are acquainted with the character of the wings of this insect, their colors etc., this will constitute ample authority for its presence. In the autumn, an old pupa skin was collected, and the following April, another was found at South Amboy, New Jersey.

1888.

On the 16th of June while in the valley of Logan's Spring brook I heard a *zing* in the distance like that produced by the seventeen year *Cicada*. As it stopped shortly and was not repeated the search was abandoned. Eight days later when by the same brook the song was again heard, and this time followed to apparently the same tree from whence it came on the previous occasion. After some

search the insect was detected on the under side of a limb, and captured. One of its fore wings was deformed so that it was unable to fly, and of course must have been born in the immediate vicinity. This was the only individual seen during this year.

1889

Brood No. VIII was expected to appear in southern Massachusetts, on Long Island and in parts of Pennsylvania and West Virginia in the summer of 1889. It returned, according to a note in Vol. 1, No. 4, of the Proceedings of the Entomological Society of Washington, in considerable numbers in parts of North Carolina and West Virginia, and in less numbers in the District of Columbia, Maryland and New Jersey.

The only evidence that the seventeen year *Cicada* occurred on Staten Island in 1889, consists of a pupa skin found on a grass stem during the summer, by Mr. Jos. C. Thompson, and kindly given to me.

1890.

During this year the *Cicada* was not expected to occur in any part of the country. In June and July, I found in a garden in New Brighton, three pupa skins, and my sister discovered one of the perfect insects on the trunk of a pear tree, but it was unfortunately destroyed by the family cat. Mr. Leng also found a red-eyed *Cicada* on an apple tree near the Moravian Cemetery, while he was "beating" for Longicorns.

On the 8th of September, 1890, I found, in a hill of potatoes, a live red eyed *Cicada* pupa; which I endeavored to rear, but without success.

1892.

On June 5th, I heard a seventeen year *Cicada* at West New Brighton, and the

next day Mr. Leng's children caught me a specimen, and a few days later a second example. On the 11th of June there were many of the *Cicadas* singing in the high trees about Logan's Spring brook, and on the 12th, I heard one near Rossville.

1893.

On June 11th, the *Cicadas* were fairly numerous in the woods along Willow Brook, and later in the month I heard them along Logan's Spring brook. Mr. Leng's children also gave me two specimens from his garden at West New Brighton.

It is well-known that a few seventeen year *Cicadas* often make their appearance in the year previous to their general visitation, so that those collected in 1893, and even in 1892, may have been precursors of the general swarm which is to come early next summer, that is, seventeen years from the visitation of May and June, 1877.

Mr. Arthur Hollick read several brief memoranda upon the visitation of 1877 and stated that his father, Dr. F. Hollick, had referred to his recollections of their appearance in 1860 and 1843. Mr. Gratacap remarked upon the conspicuous number of dead branches caused by the *Cicada* in 1877, and Mr. Henshaw stated that he had found Periodical *Cicada* pupæ under a bowlder in his garden last fall.

Mr. Leng exhibited his fine collection of beetles embracing about fifty thousand specimens, and two thirds of the ten thousand species found in North America north of Mexico. About thirteen hundred species have been collected on the Island.

The chairman appointed Mr. Wm. T. Davis editor of the current Proceedings.

PROCEEDINGS

OF THE

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

VOL. IV. No. 5.

MARCH 10th, 1894.

Meeting held at the residence of Mr. L. P. Gratacap, Bement avenue, West New Brighton. The president in the chair.

Messrs. E. Lyman Low, West New Brighton, Fred F. Hunt, New Brighton and Wm. F. Robertson, New Brighton, were elected active members.

Mr. L. P. Gratacap exhibited pieces of a drift boulder containing fossils, and read the following paper:

ADDITIONS TO THE DRIFT FOSSILS OF STATEN ISLAND.

These specimens represent the remainder of one of the boulders found by Mr. Arthur Hollick, at Prince's Bay, last Autumn, mentioned in our Proceedings for Nov. 11th, 1893.

The rock is a lower Helderberg limestone, somewhat crystalline and shaly, and affords numerous fossils, conspicuous amongst which is *Stropheodonta varistriata*, var. *arata*, Hall, a fossil brachiopod characterized by a very convex ventral valve and by prominent ribs, which are scored by numerous delicate striae, easily discernible under a low magnifying power. This fossil assumes some importance, in its numerical representation, in the lower Helderberg beds of Becraft's mountain, east of the Hudson river, in Columbia Co., and the most easterly exposure of the Helderberg series of strata in New York State. It seems safe, from this fact, and a close lithological similarity in the material of the boulders with the Becraft stone, to conclude that this "wanderer" commenced its travels southward from that distant point. Associated with it are a few lamellibranchs, which

are seen less commonly in our drift material, and were actually less important elements in the Helderberg sea. These are *Pterinea communis*, Hall, *Pterinopecten bellula*, Hall, and *Aviculopecten umbonata*, Hall; all new to the Island. Upon one of these *Pterinea communis* there is the half effaced trace of a pygidium or tail of *Lichas Bigsbyi*, Hall, a trilobite and a not common species, usually found in separated heads and tails. Its identification as *Lichas* is unquestionable, but in the complete absence of any considerable evidence, from the poor nature of the specimen, it is not certainly separated from *L. pustulosus*. If *Bigsbyi*, as is probable, it also indicates Becraft's mountain as its origin. Amongst the brachiopodous remains in these fragments we find *Rensselaeria mutabilis*, Hall, *Meristella bella*, Hall, and *Orthis eminens*, Hall; all new in our Island finds. Besides these molluscs there are seen, in these fossil remains, plain and broad sheets, or fronds, of the bryozoan *Lichenalia*, showing both the poriferous and non-poriferous surfaces. The species I am unable at once to determine. Besides this there is a fenestrated bryozoan, *Fenestella Aesyle*, Hall, as far as I can fix on its specific nature. The heteropod *Platyceras Gebhardi*, Hall, is another new species, although this reference may be doubtful, as in this genus of shells the species run insensibly into each other and the present multiplication of these specific names seems provisional. The additions are:

Orthis eminens, Hall.

Meristella bella, Hall.

Rensseleria mutabilis, Hall.

Lichenalia, sp?

Fenestella Aesyle, Hall?

Pterinea communis, Hall.

Pterinopecten bellula, Hall.

Aviculopecten umbonata, Hall.

Platyceras Gebhardi, Hall.

Lichas Bigsbyi, Hall.

Amongst these specimens are two Oriskany sandstone species, *Rensseleria ovalis* and *Platyceras nodosus*, which were detached by Mr. Hollick from the same boulder which yielded the Helderberg fossils. This places the rock in the upper Lower Helderberg strata, probably the Upper Pentamerus beds, and exhibits the faunal emergence of the life of the Oriskany ocean. This find illustrates still further, if illustration was necessary, the palaeontological importance of our drift material and provides additional incentives to further investigation.

Mr. Thos. Craig exhibited a living myxomycete under the microscope and read the following paper:

SOME OBSERVATIONS ON THE BEHAVIOUR OF A MYXOMYCETE.

In Bennett & Murray's book on Cryptogamic Botany mention is made of this form of life as the sixth sub-division. It is placed between the fungi and the protophyta; but at the end of their description they say: "We are justified in placing these organisms outside the limits of the vegetable kingdom."

Dallinger, in his edition of Carpenter on the Microscope, places them in the animal kingdom, in close affinity with the rhizopods. Saville Kent, after prolonged investigation placed them in the animal kingdom. All these writers follow DeBary, who in 1859 first published the result of his researches and his conclusions that they were more nearly allied to animals than plants. De Bary's conclusions were fully confirmed by Saville Kent, who traces the development as follows: Suppose the existence of a sporangium; this bursts and liberates the spores which in the presence of water give birth to a globular protoplasmic body, which becomes after a time a

flagellate infusorian, capable of ingesting solid food. It then loses its flagellæ and becomes an *Amœba*. Two of these conjugate and attract a number of other like bodies, or become joined to them in some way not understood. These form what is known as a plasmodium, a portion of which I exhibit under the microscope. This plasmodium is capable of apparently voluntary motion. It goes forward and retreats by a flowing motion, carrying embedded in its substance various species of algae which it has captured as food. There is a remarkable resemblance in the mode of movement between the myxomycetes and the proteomyxa. The same flowing motion of the protoplasm and the joining of the filaments to form larger ones.

The reason for the foregoing prelude is that during the month of February I have been watching one of the myxomycetes—which has developed in some water taken from the Old Town pond—into what may be called its animal stage. In the glass jar in which it is growing it resembles a miniature tree of many branches, flattened against the glass. Before it made its appearance the glass jar was so covered with growth of algae that one could not see through it. As soon as the myxomycete made its appearance and had traveled a short distance, the glass on that part over which it passed was comparatively clear. Now that the myxomycete has gone several times round the jar, the glass is quite transparent. I took some measurements of its rate of progress:

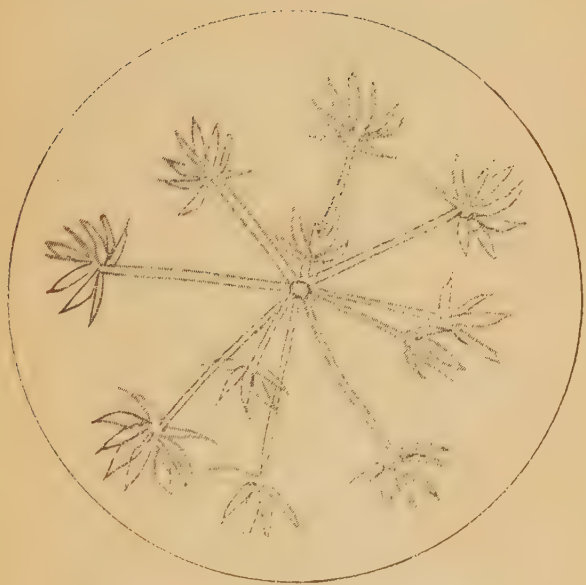
On Feb. 26, from 2.15 P.M. to 8.45 P.M. it had traveled $1\frac{1}{4}$ inches.

Feb. 27, at 9 P.M. the distance covered was $6\frac{1}{2}$ inches.

Feb. 28, at 9 P.M. $10\frac{1}{4}$ inches.

March 1, at 9 P.M. $15\frac{1}{4}$ inches.

So that you will observe the rate of progress is not uniform, but the average rate of progress was 5-26ths inch per hour. A curious circumstance is that while the plant life disappears in all parts of the glass over which the myxomycete moves, it does not seem to interfere with the animal life on the



glass. There are a large number of the brown *Hydra* and numerous small worms, which do not appear to be affected in any way, although they are surrounded by the plasmodium of the myxomycete

I have not been able to definitely name the species, owing to the absence of the sporangium, but from figures I have seen it resembles *Didymium serpula*. Of course in the foregoing there is nothing very new, but having been fortunate enough to get so fine an example, so favorably located for examination, I thought it might interest some of the members to see under the microscope, an object about which so many diverse views have been held by botanists and zoologists. Apparently the only reason for the botanical claim to it is the fact that in its reproductive stage it forms sporangia like some of the fungi, while on the other hand, from its first appearance in the water or in damp places it acts precisely like an animal in its mode

of progress and its way of taking in and digesting solid foods.

MISCELLANEOUS MATERIAL, EXHIBITED.

Mr. L. W. Freeman presented a mastodon's tooth, obtained from Staten Island Sound by Mr. Seeley Van Pelt, while tonging for oysters. Its value was not understood by the finder, who allowed it to be thrown away, with the refuse oyster shells, into Old Place creek, from whence it was recovered by Mr. Freeman.

Mr. Freeman also presented an arrow head found in old submerged salt meadow peat, about 250 ft. out from the present shore line at Great Kills.

Mr. Wm. T. Davis presented specimens of *Najas flexilis* (Wild.) Rostk. and Schmidt, found in a pond on Todt Hill. This plant, although previously reported from the Island, was not represented by specimens.

The president designated Mr. H. W. Congdon to edit the current number of the Proceedings.

PROCEEDINGS
OF THE
NATURAL SCIENCE ASSOCIATION
OF STATEN ISLAND.

VOL. IV. No. 6.

APRIL 14th, 1894.

Meeting held at the residence of Mr. Thomas Craig, Vine street, New Brighton. Mrs. Elizabeth N. Watrous was elected an active member.

Mr. Chas. W. Leng exhibited living and mounted specimens of beetles, new to or rare on the Island, with the following memoranda:

NOTES ON *BRYAXIS ABDOMINALIS* (AUBR)

Three years ago I found a number of small beetles clinging to the underside of pieces of bark and wood lying on the banks of a salt meadow creek near Arlington; the beetles were first observed by me at the point where the railroad embankment ends and the trestle begins, but Mr. Davis had previously found the same or a closely allied species at other points on the border of the salt meadow. These beetles proved to be *Bryaxis abdominalis*, one of the Pselaphidae, an addition to the fauna of Staten Island and, in view of the numbers in which they were found and the rarity of the species of this family as a rule, an addition of unusual interest.

During the early spring of 1893 and again this year I have made some careful observations to determine the date of appearance and the exact localities frequented by those beetles. They may be found early in February and as late as May, but disappear entirely in the summer months. During this brief period the eggs that are to produce the succeeding generation are laid and their life work being ended the beetles die.

To determine the localities I examined the border of the salt meadow at various points, usually accompanied by Mr.

Davis. South of Oakwood a narrow peninsula of upland juts out into the meadow and there, on March 18th, the beetles were plentiful; the slight rise of ground was littered with boards, logs and fragments of bark, carried far inland by unusual tides, and almost every piece sheltered a *Bryaxis*. They did not extend more than ten feet from the meadow and they avoided those boards which were within a few feet of the meadow and constantly damp. On March 25th we searched the border of the meadow west of Richmond. The tides reach these meadows only by way of the Fresh Kills and the wreckage is sparse, perhaps becoming stranded before it reaches so far inland. No *Bryaxis* were found. On April 1st I visited the strip of sandy upland that stretches into the meadow south of the water company's wells at New Springville. The conditions existing near Oakwood are here repeated and *Bryaxis* was found in some numbers. On the same day I crossed the turnpike and visited the meadows east of Chelsea, but there is an absence of any sharp dividing line between meadow and upland at that point; no suitable shelter is formed and no *Bryaxis* were found. On April 8th Mr. Davis, Mr. Walter Granger and I examined the meadows at Watchogue very thoroughly but found no large number of beetles. The day was, however, unfavorable and may have affected the result. During this period Mr. Davis twice visited the original locality at the trestle and found the beetles in numbers. This locality is particularly favorable; the operations of the railroad company have caused a

quantity of soil to be thrown up in hillocks and ridges which afford the necessary retreat from high water and at the same time a lodging place for the chips and bark that shelter the beetles.

As the result of these observations, repeated in different years and at widely separated localities, I think I am justified in stating that *Bryaxis abdominalis* is abundant from February to May at the border of the salt meadow all around Staten Island; living not on the meadow or near enough to feel the influence of its dampness, but under wood or bark cast by the tide upon the upland.

These beetles are quite small and Mr. Craig has kindly prepared a specimen for exhibition under the microscope.

The form of the antennae, the single tarsal claw and the sculptured abdomen of the male are the characters specially noteworthy.

The family to which this beetle belongs comprises a goodly number of minute beetles, found either beneath stones or wood or in ants' nests. Their habits are but little known; they live on animal substances and their powerful mandibles and long palpal members seem to indicate that they capture fleet and hard shelled prey; some live in pairs while others are gregarious; those living in ants' nests appear to be trueinquilines; the ants which support them, by caressing the tufts of hair about the abdomen, cause the exudation of a fluid which they greedily swallow. The larvae are unknown.

An excellent monograph, by Brendel & Wickham, may be found in the Bull. Laborat. Nat. Hist., State Univ., Iowa, Vol. 1 and 2.

It may be noted that two other minute beetles are always found with this *Bryaxis*, viz:

Seydmaenus salinator, Lec. and
Rhyphobius marinus, Lec.

They are not confined to such narrow limits as the *Bryaxis* but invariably occur where it occurs.

Mr. Leng also contributed the following:

NOTES ON *NAIAS FLEXILIS*.

The water plant, *Naias flexilis* (Willd.), Rost. & Schmidt, reported by Mr. Davis at our last meeting, occurs also at Springville and at Bull's Head.

At Springville sparingly, in a small pool on the edge of the meadow, south of Union avenue in the second large field west of the Morning Star road.

At Bull's Head abundantly, in a ditch running south from Lambert's Lane and about a quarter of a mile west of the Morning Star road.

Mr. Arthur Hollick presented a set of three barred owl's (*Syrnium nebulosum*) eggs and read the following memorandum:

THE BARRED OWL, ON STATEN ISLAND.

In our Proceedings for April 11th, 1891, may be found a short note in regard to a barred owl's nest having been found by Mr. Chas. Rufus Harte, in the vicinity of Bull's Head, on March 27th of that year. On March 12th, 1892, it was again visited by Mr. Harte, as noted in the Proceedings for April 9th, 1892. On each occasion he obtained a set of three eggs from the nest. So far as I am aware the owls were not disturbed in 1893.

I had obtained a rough diagram of the vicinity, sketched by Mr. Harte, and on March 11th, of this year, I undertook to search for the nest. With comparatively little trouble I located the tree, which is situated in the patch of woodland between Bull's Head and Willow Brook. The cavity in which the nest is located faces northwest and is about thirty feet from the ground. The tree is about five feet in diameter, and destitute of branches below the cavity, so that I found it impossible to climb up. On March 17th I obtained a pair of climbing irons, and with these readily ascended to the nest, which I found to contain the usual number of three eggs, slightly incubated.

The tree is not one which would be likely to attract attention, as it is a vigorous living red oak (not a sweet gum as originally stated,) and the cavity is not conspicuous. The female bird was readily alarmed—a slight tap on the tree being

sufficient to cause her to leave the nest and to retire to some distance. I did not see the male bird at any time.

In this patch of woods gray squirrels are yet comparatively abundant and one or more pairs of red shouldered hawks nest there every year, besides many crows, but it is doubtful if they can remain undisturbed much longer, as the timber is large and valuable and in several sections the finest trees have been thinned out quite recently.

Mr. Wm. T. Davis exhibited a living pupa and mud cone of the seventeen year locust, with the following memorandum :

SEVENTEEN-YEAR LOCUST PUPAE.

The pupæ of the seventeen year *Cicada* have made their appearance. While searching for *Bryaxis*, with Messrs. Leng and Granger, on April 8th, I found several under boards on the edge of the meadow at Old Place creek, one of which I am able to exhibit alive. The ground being damp the pupæ had erected their usual towers of earth, the boards not lying sufficiently close to the uneven ground to prevent their construction.

In the Proceedings for February 10th, 1894, the *Cicadas* that appeared in 1881 should have been referred to Brood XVII instead of XVIII,

Mr. Davis also presented the following abstract :

RECENT LITERATURE RELATING TO STATEN ISLAND.

Staten Island's Colonial Houses. (New York *Herald*, Sunday, March 11th, 1894.)

In this article the following eight colonial houses are mentioned and a

general illustration, occupying the middle of the page, gives a more or less complete view of each:

Vanderbilt Cottage at Stapleton.

Van Duzer Homestead at Stapleton.

Barton Cottage at Clifton.

Perrine Homestead at Garretsons.

Black Horse Tavern at New Dorp.

Guyon House at Oakwood.

Billopp House at Tottenville.

Pelton Homestead at West New Brighton.

In his preliminary description of the Island the author refers to the "watering place" as if still existing, and to the "Oude Dorp, now called New Dorp." The watering place spring was filled in many years ago, and the Oude Dorp was located near the Narrows, the original New Dorp lying at the foot of the present lane bearing that name.

MISCELLANEOUS MATERIAL EXHIBITED.

Mr. Geo. H. Pepper exhibited specimens of Oriskany sandstone and Helderberg limestone containing fossils, from drift boulders at Tottenville.

Mr. Walter C. Kerr called attention to and commented upon some sand, colored by a black substance having a strong sulphurous odor, obtained in depressions in the salt meadows near Giffords.

Mr. Thos. Craig exhibited, under the microscope, living specimens of *Hydra*, in order to show its movements; a salamander to show the circulation of blood in its gills, and mosquito larvæ in process of development into mosquitos.

The president appointed Mr. W. P. Heineken to edit the current number of the Proceedings.

PROCEEDINGS
OF THE
NATURAL SCIENCE ASSOCIATION
OF STATEN ISLAND.

VOL. IV. No. 7.

MAY 12th, 1894.

Meeting held at the residence of Mr. Samuel Henshaw, Manor Road, West New Brighton.

In the absence of the president Mr. A. K. Johnston was elected chairman *pro tem*.

Mr. Ira K. Morris read a paper upon "The New Dorp Duelling Ground and Its Victims," which will be published as a separate number of the Proceedings.

Mr. Wm. T. Davis read the following paper:

STATEN ISLAND CROWS AND THEIR ROOSTS.

"Towards the close of summer," says Alexander Wilson, "the parent crows, with their new families, forsaking their solitary lodgings, collect together, as if by previous agreement, when evening approaches. About an hour before sunset they are first observed flying somewhat in Indian file, in one direction, at a short height above the tops of the trees, silent and steady, keeping the general curvature of the ground, continuing to pass sometimes till after sunset, so that the whole line of march would extend for many miles. This circumstance, so familiar and picturesque, has not been overlooked by the poets, in their descriptions of a rural evening. Burns, in a single line, has finely sketched it:

"The blackening trains of crows to their repose."

The most noted crow roost with which Wilson was acquainted was on a low, flat, reed-covered island in the Delaware, known as the Pea Patch, and he tells how a violent north-east storm coming up during the night inundated the entire island and caused the death of thousands

of the crows, which were seen next day floating in the river. From this roost they are supposed to have moved to Reedy Island, upon the erection of Fort Delaware, in 1814. Crows, however, usually sleep in trees, notably in evergreens, and Reedy Island is the only roost of the kind mentioned by Mr. Samuel W. Rhodes, in vol. xx, No. 8, of the *American Naturalist*, who records four existing roosts in the neighborhood of Philadelphia.

On Staten Island there are no crow roosts where fifty or one hundred thousand birds congregate, but personal observation during the last few years upon the habits of these black citizens has disclosed many interesting facts for this locality. It may be said at the start that as far as observed no able-bodied crows roost on Staten Island after the first week in December, be the season mild or severe.

Crows hold numerous conventions in February and March, when many aerial gymnastics are gone through with, and a wonderful amount of curious cawing is heard, all of which seems to relate to marriage matters and also possibly to migration. One of the most noteworthy facts relating to their migration was noticed in March, 1890. The seventeenth of the month and the few preceeding days were mild, and many crows were seen in the morning flying northward over the Island at New Brighton, in the direction of the Hudson river. Snow and cold weather followed the mild days, and the New York *Tribune*, on March 20th, recorded a large flock of crows alighting on the previous day at Battery Park, and they were also seen flying southward

over Central Park.

Either through age, choice, or necessity, many of the Staten Island crows apparently build no nests, but abide instead, in what may be called warm-weather roosts. As early as April and May flocks of them may be seen at evening about these roosts, and with the cessation of family cares, as the season advances, the numbers are greatly increased.

I

In the warm months it will be observed that the crows on the Island mostly fly at evening in two directions, namely, toward Old Place on the North Shore and towards the woods at Annadale. At first some of the movements of the various flocks will seem to contradict this, but if evening after evening different stations are taken it will be seen in due time that the above statements are correct.

To the north of Old Place there is a long ridge of slightly elevated land in the salt meadow, on which thrives a thick growth of deciduous trees, and it is in these, and in the immediate vicinity, that the crows have the smaller of their warm weather roosts. I have seen them congregating in the late afternoon every summer since 1889, chiefly in a large dead tree that towers above the surrounding growth, but a few of the specific observations made in 1893 will suffice.

On July 13th twenty crows were perched on the dead tree waiting until night-fall to drop into the surrounding thick growth of young timber, while others were in the neighboring trees. On the 25th the crows were seen from Old Place Creek meadow, flying toward the roost. Many of them waited until the sun was nearly out of sight before they flew directly to the trees. On July 30th a flock of crows was observed flying in the late afternoon over the Clove Road near Columbia street, in the direction of the roost. On August 13th I stationed myself at the end of the dock at Linoleumville, but saw no crows fly from Staten Island to New Jersey but on the other hand about ten came from the vicinity of the Rahway River to the Island, some evidently going to the Old Place roost

and the others to Annadale. On August 30th I stationed myself in the thick woods frequented by the crows, and found that only a few roosted together, or in the same tree, and that these little gatherings were scattered throughout the thick growth of timber. Just at night-fall several crows lit silently in the trees near me, but flew away with a loud caw because of my presence. After it was dark I came upon a single crow roosting in a tree on the edge of the woods.

Before it is quite time for the crows to retire they perch on the higher branches of the trees, as well as on the great dead tree, and call four or five varied notes, the most common one being *caw-or, caw or*.

In the same wood the fish crows roost in small numbers, and also about thirty or forty bitterns. These latter birds occupy the wood by day, and when the crows come to the trees at evening they are ready to prosecute their nocturnal fishing excursions on the meadows of Newark Bay, or along the minor creeks connected with the Sound.

Sometime in the fall, but gradually, the Old Place warm-weather roost is deserted by the crows, and they, with the greater number that roost near Annadale, betake themselves to a winter retreat in New Jersey.

II.

By far the greater number of crows that frequent the Island visit the South Beach. This is particularly so in the colder months, but even in summer much of the food supply consists of the dead and dying creatures that are cast ashore. If the crows that visit the beach are watched in the afternoon it will be observed that they fly westward, pass over Oakwood, and follow the belt of timber to Green Ridge, and thence, in the warm months, to the broad fields and thick growth of timber between Annadale and Huguenot. The crows that gather from nearly all the remainder of the Island follow the ridge of the hills, and congregate near the old British fort back of Richmond, from whence they also fly to the Annadale woods. A few observations, taken from a considerable number that

have been made, will illustrate the facts sufficiently

On August 5th, 1893, from 5 p. m. to 7 p. m., crows left in numbers the cedars on the hill side back of St. Andrew's church, at Richmond, and the osage orange trees that grow along the brow of the hill, the flocks often containing as many as twenty-five birds, and I counted one of forty-five. At times the fields just north of the trees contained a considerable number of crows, walking about preparatory to their flight. A few of the crows flew at first to the patches of woods in a line with Oakwood, but by far the greater number, about two hundred and fifty, flew directly over the salt meadows to Green Ridge.

On August 6th, 1893, in the high fields between Annadale and Huguenot, a flock, by count, of over three hundred crows had gathered, and there were many more in the woods near by, and others constantly arriving. At dusk the crows in the field flew to the woods. All of them did not roost in a few trees close together, but were scattered about the vicinity in small assemblages.

On the 27th of November, 1892, I found only a small flock of about forty crows remaining in the Annadale roost. At dusk they were making considerable noise, uttering a variety of strange notes, many of which were subdued and conversational. When it was quite dark I crept on hands and knees into the woods, which consisted mainly of young oaks, to within about forty feet of the crows, when suddenly one sounded an alarm, and the others flew from the low trees without uttering a sound. They lit only a few yards away, but scattered in their flight, and the crow who did the cawing lit in the next tree from that used as a roost.

The Annadale woods was visited on the 11th of December, 1892, and on the 23rd of December, 1893, for the purpose of observing whether the crows frequented them at that season, but though a few flew by, all were found to be on their way to New Jersey.

The crows have assembled at evening in the Annadale woods for many years, at least during the warm months, and their

habits in this respect are well known to the residents of the immediate vicinity.

III.

It now remains to mention the habits of the crows on the Island during the colder portion of the year. It was remarked above that on the 27th of November, 1892, only a small flock of crows were found in the Annadale woods, most of them preferring to fly to New Jersey, and that by the middle of December they were entirely gone. On January 2nd, 1893, Mr. Leng and I watched the crows, with a glass, fly from Green Ridge along the Fresh Kill to New Jersey. On the 8th of January I stood on the end of Long Neck, at Linoleumville, and between 2.15 and 3.45 P. M. counted 162 crows flying along Fresh Kill to New Jersey. The meadows were white with snow and the crows showed plainly. Most of them flew close to the meadow straight across the Sound and then turned north-westward. Many more that were not counted flew across the Neck diagonally, and though they had to fly much higher, it was evidently a shorter way to their roost.

Sunday, December 24th, and Christmas day, 1893, were both very mild; there was a warm wind and no snow on the ground. Both days were devoted to Long Neck and the crows. On these occasions several hundred gathered on the salt meadows in the afternoon, near the head of the main branch of the Fresh Kill. On the 24th it was cloudy and showered occasionally and the crows commenced flying to New Jersey at 3 p. m. The 25th, on the contrary, was a bright sunny day, and the first crows did not start until 3.30 p. m. On this last occasion I counted 303 crows flying over at right angles to the Turnpike and thence over Chelsea and Dongan Island, like a long straggling caravan following an aerial highway.

They do not take exactly the same path always; occasionally some follow the Kill, as has been stated above, and those that fly across the Neck are governed considerably by the direction of the wind. One blustery day in February Mr. Walter Grauger and I watched the first crows fly

over the Neck, drop close to the fields in order to avoid the force of the north wind, and finally fly along Chelsea Creek to New Jersey. The birds that followed flew by a more circuitous route, keeping among the scattered timber and thus avoiding the full strength of the gale.

Again, all of the crows that fly westward from the beach do not cross Long Neck or follow the Kill to the roost situated north or north-west of the island, but a few continue along the high ground from Annadale to Kreischerville, and are apparently bound for a roost that lies beyond the Raritan. On calm days they may be watched for miles with a glass, as they fly sky high on their journey. Crows go long distances either on business or pleasure, and also to most unexpected localities. As an instance of this I observed, on April 1st, 1884, as the Staten Island boat left its New York slip at 4 p. m., one of these birds fly along the East River, over Governor's Island, then down the bay until Bayonne was reached, and then in the direction of the New Jersey roost first referred to. The progress of the boat helped me to follow the movements of the crow.

In the severe winter of 1892-93, crows not only came from the New Jersey roosts already mentioned, but they also came to the South Beach from the roost at Sandy Hook. They went long distances for food and no doubt many died. Mr. Robert Ridgway, in *Science* for February 10th, 1893, tells of the sufferings of the crows in a roost near Washington, D. C., stating that many had their eyes frozen, which was followed by the bursting of the organs and the death of the birds from starvation.

On the afternoon of the 22nd of January, 1893, many crows were noticed near the foot of New Dorp lane. Some of these birds flew westward in the direction of Oakwood and Green Ridge, while several hundred flew over the water to Sandy Hook. The chief departure was about 4 p. m. At fifteen minutes past four they had nearly all gone, but I observed a few belated individuals fly boldly from the Staten Island shore near the light house, without any rest previous to undertaking their long journey. Thus many of the crows that were walking together on the beach flew in opposite directions as the afternoon wore away, and roosted in

widely separated parts of New Jersey.

The Rev. Samuel Lockwood, writing of the evergreen groves on Sandy Hook, in the *American Naturalist* for August, 1892, says: "Here are rookeries of crows which almost blacken the air as they return in the evening from their daily foraging." As far as my observation extends it is only in very cold weather that they continue their flight to Staten Island and its store of food on the South Beach. My grandmother once told me that the crows came to the Island from the Hook, but her observation was probably made during some severe winter like that of 1892-93.

No doubt fewer crows now roost on our Island in summer than formerly, certainly a less number nest here; and no doubt again, as time wears on and the Island becomes more inhabited, they will visit it less even in winter. Then these observations, which may now be verified by any one taking the trouble, will become but historical facts, like Wilson's crow roost, on Pea Patch Island, in the Delaware river.

MISCELLANEOUS MATERIAL EXHIBITED.

Mr. L. P. Gratacap called attention to the specimens of Oriskany sandstone and Helderberg limestone exhibited by Mr. Geo. H. Pepper at the previous meeting, and remarked upon them as follows:

These fragments of drift boulders represent the shaly layers of the lower Helderberg limestone and the coarse strata of the Oriskany Sandstone. Amongst the fossiliferous remains from the lower Helderberg one addition to our list was determined: *Streptorhynchus punctulifera* H. The Oriskany fragments were filled with *Spirifer arenosa* Conr. and *S. arrecta* H., but on one slab was an unusually robust specimen of *Pholidops arenaria* H. and near it a broken cast which suggested *Megambonia*, a lamellibranch not yet identified amongst the drift fossils of our Island. Upon another small slab was *Rensselaeria ovalis*, H. and *Pterinea textilis*, H. both rare in our drift material. Amongst these impressions was also one of *Strophodontia magnifica* H. also uncommon.

Mr. Gratacap also presented an arrow head, found by Mr. E. W. Doherty at Erastina.

Mr. Wm. T. Davis exhibited living specimens of *Riccia natans* L. from a pond on Ocean Terrace.

Mr. Ira K. Morris presented specimens of serpentine rock, struck at a depth of 35 feet in a recent well boring at the Moravian cemetery.

The chairman designated Mr. Morris to edit the current issue of the Proceedings.

PROCEEDINGS
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VOL. IV. No. 7.

(SPECIAL NO. 17)

MAY 12th, 1894.

THE NEW DORP DUELLING GROUND
AND ITS VICTIMS.

BY IRA K. MORRIS.

Those familiar with the "lay of the land" at New Dorp will recall a graceful knoll on the right of the Amboy road, in a direction south-west of the Black Horse Tavern. Behind this—or, rather, to the west of it—is a hollow, which was, a century or more ago, surrounded by dense woods. Far more than a score of duels have been fought at this spot.

The knoll to which I allude was named by the British "Camp Hill," and its delightful situation soon made it a resort for the officers of that army. Indeed it soon became a miniature "Monte Carlo," and witnessed the ruin of many a promising member of the King's army.

Gambling and duelling in those days were practised to such an extent as to threaten general demoralization to the troops. Sir William Howe repeatedly summoned his generals in council in the "Rose and Crown," his headquarters, with a hope that means could be effected to break up the nefarious practices. Nearly fifty officers were court-martialed and dishonorably dismissed during the encampment of the British army at New Dorp, in consequence of gambling and duelling.

The fact became notorious at one time that even general officers so far lost their dignity and their regard for military discipline that they sat down to the gam-

bling table with private soldiers, and even servants, so great was their greed for money; while, once beyond the shadow of Camp Hill, they would exact the severest discipline and all the bowing and saluting and mimicry that military etiquette permits.

The story has been told of a young Scotch officer who, after losing all his money on Camp Hill, requested a loan from his rival at the gambling table, in order that he might meet an obligation on the following day, and, on being refused, went alone to the secluded ravine beyond and gave up his life in disgrace.

In this ravine General Robertson, of the British army, settled an old account with a French naval officer, named Vollogne, who had resigned his commission and come to this country for that express purpose. It is said that General Robertson's fellow officers attempted to arrange an amicable settlement, but without avail. The General escaped unharmed; but his adversary received a wound in his breast, from the effects of which he died a few months afterward in Quebec.

Lieutenant-Colonel John Graves Simcoe was challenged and met his adversary here, in the person of Colonel Mawhood, who based his grievance upon the belief that Simcoe had exercised undue influence to succeed him as commandant

of the Queen's Rangers. Colonel Simcoe was a fine swordsman, and being the challenged party, naturally had the choice of weapons. He selected "officers' swords" (presumably those carried by the officers of the Grenadiers), and he proved too skillful a manipulator of cold steel for his adversary, who gave up the contest with a broken arm.

Colonel Illig, a dashing young officer on Sir William Howe's staff, who was afterward killed at Prince's Bay, while carrying orders to General Vaughan, here settled an "affair of honor" with Colonel Pentman. From what I have been able to learn from descendants of Colonel Pentman, there was an "old grudge," which had been continued from their school days at home; and this was the first time they had ever met with an opportunity to effect a settlement. Major André, then a captain in the Twenty-second Regiment of Foot, acted as second for Colonel Illig.

They fought with cavalry sabres, in the handling of which they were both said to have been experts. They were mounted on blooded horses, the protection and management of which called into requisition triple the amount of skill required for ordinary ground fencing. According to my informant, the combat continued steadily for more than one hour, and men and horses were almost exhausted from fatigue. The combatants were both badly cut, but not seriously, while their innocent beasts were lacerated so as to render them unfit for further military service. The "affair" was a drawn battle, as neither was able to continue. They were carried to their quarters—Colonel Illig to the Rose and Crown, and Colonel Pentman to his regiment, which was encamped near by. A second attempt was made to "settle the account;" but Sir William Howe prevented it by a personal appeal to the duellists, both of whom were his intimate friends. It is said to have been a great relief to Colonel Pentman's friends when Colonel Illig was "out of the way." Colonel Pentman, however, remained in the army until the close of the Revolution, and

finally died from the effects of a wound received in a duel with an Austrian cavalry officer, with whom he was serving, near the close of the last century.

General Skinner was challenged to fight on this ground, by a Hessian nobleman named Von Lochit, who had sought the position that was given to Skinner—that of commandant of the Native Royalists, or "Skinner's Greens," as they were familiarly called. The Count believed that he would be able to remove General Skinner in this manner, and then not only have his rival out of the way, but prove his bravery and skill so forcibly to the commander-in-chief, that he would be immediately appointed. Sir William, however, informed General Skinner that he was determined to break up duelling among the officers of his army, then so popular, and if he (Skinner) went on with his determination to meet the Count, he would certainly be court martialed and disgraced. General Skinner presented his resignation, but Sir William would not accept it. Count Von Lochit was requested to leave the country, lest he should get into serious difficulty with the military authorities, and so he drifted off to Nova Scotia, and finally back to his native land. General Skinner was afterward shot by Lord Sterling, who was in command of American troops which had crossed the Kills from New Jersey to raid the North Shore of Staten Island. General Skinner's headquarters were in the old Pelton house (still standing) at West New Brighton. He was shot while standing on the bank in the cove, directing his men, and was carried into the old house in whose hall he died in a few minutes. His grave is in the Episcopal burying ground at Perth Amboy, within sight of the old family mansion. His son afterward became a Lieutenant-General in the English army.

Colonel Christopher Billopp is said to have had an "honorable encounter" with General Erskine on this ground, neither of whom were injured. Afterward they became the warmest of friends.

The only duel known to have been fought by "plain citizens," on the New

Dorp ground, was "between young Hamilton and Lathrop." It is presumed that this was the son of Alexander Hamilton, who finally died in a duel at Weehawken, on the identical spot, but prior to, where his father was shot in 1804. Lathrop was an English lawyer, who had come to this country in the interest of Tory claimants.

The romance of this dark spot is told of two line officers belonging to a Highland regiment, encamped at New Dorp. They had learned to love a fair Staten Island girl, who had become a belle among the officers at the post, as her father was a volunteer aide-de-camp on the staff of Sir William Howe. They had learned to hate each other with the same intensity that they loved the girl. Friends interceded, after it was learned that a challenge had been given; but neither would give way. They met, with so much anger in their hearts, that they could not be persuaded to clasp each other's hand before the fatal moment to fire arrived. Their seconds, two fellow officers, paced off the ground and then placed a heavy duelling pistol in the hand of each. When all was in readiness each second stood in front of his principal and pleaded for a reconciliation. "We are determined to fight!" was the only response. Then the seconds stepped aside and the fatal word was given. Both fell, mortally wounded; both died in the course of a few days and their remains were laid away in old St. Andrew's cemetery at Richmond. Their graves, which were side by side, were never marked; but they were long kept green by the same hand the two nameless duellists had died to gain. An aged Staten Islander, who knew this lady well when she had grown very old, and was childish and feeble, said that he had repeatedly heard her tell the story of the lovers of her youth, and that she firmly believed that some day one or the other would come back to her and claim her for his bride.

At the commencement of the present century, when what is now Twenty-first street, in New York city, was far out in the country, and was known by no other name than "Love lane," reaching from

shore to shore, and lined on either side by great elm trees, it was the scene of many a wicked duel. One of these, however, was planned to take place at New Dorp; but a severe storm prevented it at the time designated. When the parties had got together again they were disappointed in the arrival of the barge which was to bring them down the bay to Staten Island, and so the seconds selected "Love lane."

The principals in this duel were William Coleman, a lawyer and editor of the *Evening Post*, and Captain Thompson, Harbor Master of New York. A bitter newspaper war was in progress between Coleman, of the *Post*, and Cheetham, of the *American Citizen*. Those editors, as many another has done before and since that memorable period, were simply fighting the battles of their political friends, while down in their own hearts there may not have been the slightest personal enmity, until their own private honor was attacked. Captain Thompson, who was a personal friend to Cheetham, insinuated that "Coleman had shown the white feather," and the result was a challenge. William Cullen Bryant, in his "Reminiscences of the *Evening Post*," tells this story of the event:

" * * * The twilight of a winter's evening found the parties arrayed against each other in lonely 'Love lane.' It was cold, there was snow on the ground, and it was nearly dark. A shot or two was exchanged without effect, and then the principals were placed nearer together, that they might see each other better. At length Thompson was heard to cry, 'I've got it!' and fell headlong on the snow. Coleman and his second hurried away, while the surgeon viewed the bleeding man, examined his wound and said that it was mortal. On learning his fate, Thompson, at the surgeon's suggestion, promised never to divulge the names of the parties, and with a heroism worthy of a holier cause, he kept his word. He was brought, mortally wounded, to his sister's house in town. He was laid at the door, the bell was rung, the family came out, and found him bleeding near

his death. He refused to name his antagonist, or to give any account of the affair, declaring that everything which had been done was honorably done, and desired that no attempt should be made to seek out or molest his adversary."

Aaron Burr and Alexander Hamilton are known to have visited New Dorp and to have stopped at the Rose and Crown, on more than one occasion, between the close of the Revolution and the end of the century. They were both firm believers in the very popular idea of that day, that "a duel was an affair of honor," and that it was the proper means by which gentlemen should settle their personal difficulties, instead of going into court and being subject to the "law's delays." They certainly knew all about the duelling ground at the foot of Camp Hill, and it seems reasonable to assume that they, too, have visited the spot and beheld the peaceful scene, which had been desecrated by those whose sad errors were committed long ere their own should shock the world.

Who knows but that the distance over the restless waters over the bay, on that memorable July morning, in 1804, is alone responsible for preventing the occurrence at New Dorp of those scenes which must forever darken the name of Weehawken Heights, and fill with regret and sorrow and pity the heart of every American citizen which appreciates the noble qualities which Burr and Hamilton both possessed? Unlike any other duel ever fought in the land, both fell—one to his grave and the other in the estimation of his countrymen.

I have always believed that Hamilton was the aggressor; but his unceasing persecution of Burr led to his own death and the abolition of popular duelling in America. Burr stood in the way of several ambitious politicians of both the Democratic and Federal parties, and they sought to "down him" and to injure him by every means in their power. It is remarkable to find in history that what was considered treason in Aaron Burr, at the time in which Jefferson, Hamilton, Clinton and other leading men of the

country were fighting him, step by step, was, in after years, considered the very acme of loyalty and patriotism in others. But such, indeed, are the changes and vicissitudes of American politics.

I have endeavored to learn the date of the last duel fought at New Dorp, and am convinced that it was the one in which "young Hamilton and Lathrop" participated, which was probably about 1790; and that it was the only one fought here after the departure of the British army from Staten Island. So it may be classed as almost exclusively a military duelling ground.

A short distance from Camp Hill is an old well and the brush-covered remnant of the foundation of a house. I have been informed by old citizens, who have been familiar with these surroundings for upward of seventy years, that the scene has witnessed no change within their recollection; and more than one has expressed the belief to me that those relics mark the site of one of the historic structures that stood there during the exciting days of the Revolution.

But Camp Hill and its duelling ground form a scene to-day, so peaceful and secluded, that no one would ever judge them of their black deeds. During the preparation of this article I have visited the place when the shadows of eve were lengthening, when the robin, the oriole, and the bobolink were calling and twittering among the leafy branches, when nature in all her matchless beauty had completed her springtime robe of hill and ravine, and when the hum of insect life and fragrance of blossom all combined to form a picture of "peace on earth, good will to man;" yet I did not feel that I stood on hallowed ground. My mind wandered back through the dim vista of the past, and I recounted the stories of misguided ambition, of wasted heroism, and of the cruel wrongs to loved ones who lived to mourn over the folly of those who fell. But the holy hush of a century of peace, like a benediction from heaven, has rested over its surroundings, so often reddened by human blood; and the footstep of the rambler and the plowshare of the sturdy farmer have alone disturbed the verdure of its soil.

When the final story of the world's cruel wrongs are told—when foe shall meet foe in the presence of the Eternal, to render up an account of the parts they have taken in the struggles on this historic field—may God, in His infinite wisdom, forgive those who mistook wrong for right, and in the heat of passion sinned against every principle that goes to form divine and human law.

PROCEEDINGS

OF THE

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

VOL. IV. No. 8.

JUNE 9th, 1894.

Meeting held at the residence of Mr. Walter C. Kerr, 95 Tompkins avenue, New Brighton. The president in the chair.

The secretary reported the following new exchanges effected since the previous meeting :

Wisconsin Academy of Science Arts and Letters; Natural History Society of New Brunswick; Milwaukee Public Library; Geological Survey of Canada; Essex Institute; *The Ornithologist and Oologist*; *The Nidiologist*; *The Microscope*. Also that \$61.00 had been subscribed to date by members, towards a fund for binding the serials now in the library.

On motion the executive committee was authorized to represent the Association in any matters which may arise in connection with the forthcoming meeting of the American Association for the Advancement of Science, in Brooklyn, during the summer.

On motion the president was authorized to appoint a committee to prepare and submit a plan for the preparation and issue of a comprehensive work upon the natural history and antiquities of the Island, based upon the material now in the possession of the Association.

The secretary read the following extracts from a journal contributed by Mr. William Ollife, written during the period of the civil war, while collector at the old Tompkinsville ferry landing:

1862.

February 23rd—Departure of ferry boat "Westfield" to the war to-day.

July 4th—Four boats running to-day. Have to give everybody pennies in change

(the large copper ones). Change very scarce. Fare six cents to New York.

July 19th—Taking postage stamps and shinplasters for fare on the boats.

July 21st—Took fifteen dollars to day in postage stamps for ferriage.

July 23rd—Received this day for ferriage nothing but postage stamps and pennies.

July 26th—All the bills, silver and cents I received was \$2.75. The balance in postage stamps—ones, twos, threes, fives and tens—upwards of \$40.00.

July 28th—Received for ferriage to-day seventy dollars in postage stamps and cents. Received 4,000 cents. Used small envelopes containing 19 cts., 44 cts., and 94 cts., in postage stamps as change.

August 31st—Great war meeting in Clifton to-day. A great many present.

September 1st—Received at Tompkinsville landing for passengers' fare, \$224.35. Forty dollars in pennies and sixty dollars in postage stamps.

September 8th—5,000 passengers to Tompkinsville to-day. * * * * Received this day \$103.00 in postage stamps, the balance in cents (large copper). Kept three of us until 11 P. M. to count them up and put in dollar packages * * * *

September 10th—Commencing this day to collect names for the draft on the island.

September 15th—Sunday—Quite a travel. In the rush for the boats broke down the gates. Had to send to camp for a company of soldiers.

September 16th—Duryea's Zouaves sent down to-day to go in camp.

September 18th—Presentation of colors to Police regiment who were encamped

here,

September 24th—Three hundred artillerymen arrived to-day from Sacketts Harbor.

October 8th—The 2nd Police regiment left to-day. Took all day to get them away. Such an unmerciful howling from the women I never heard before and hope never to hear again.

November 14th—People refusing to take postage stamps for change. New issue of currency.

November 22nd—A ship arrived to-day at Tompkinsville with flag upside down. Captain and one man killed. Officers went on board and took the crew prisoners.

December 3rd—Change of time. Boats leave the Island 7 A. M. to 5 P. M. From New York 8 A. M. to 6 P. M.

1863.

January 6th—Stopped taking shimplasters. Nothing but U. S. postage currency.

January 31st—Old Mr. Quinn, chaplain of the Sailor's Snug Harbor, shot dead by one of the sailors to-day.

February 7th—Ferry houses at Vanderbilt's Landing burnt at 7 P. M.

March 5th—Received a silver 50ct. piece for ferriage—the first in a long time.

March 30th—Ferry boat "Clifton" taken by the government.

April 1st—Change of trips: S. I. 6 A. M. to 7 P. M. N. Y. 7 A. M. to 7 P. M. "Westfield" and "Josephine" running.

April 30th—An ugly fight among emigrant runners on Arrietta street, front of Masonic Hall.

May 6th—Great storm. Many trees destroyed in front of Wiener's by some vandals cutting off the bark and killing the trees.

May 9th—Some vagabond cut all the lines on the ferry boat attached to the life preservers.

May 11th—Quite a large number of rowdies down to attend a prize fight. After staying all night were disappointed. Some 100 went up from Tompkinsville early next morning.

June 6th—First trip of new boat

"Northfield."

June 8th—A large number of bad characters and thieves came down to Pavilion Hill to-day. Wound up with a terrible fight at 7 P. M.

July 14th—Troops drawn from the island on account of draft riots in New York. Railroad depot at Vanderbilt's Landing burnt by rioters. Threats made to destroy many houses—my own being one of the number—on account of my being a friend of the Union.

July 15th—Heard this morning that my house was to be burnt. Sent my wife and children to Brooklyn and buried my most valuable things in large holes in the ground for safety. I and my son George hid in the woods.

July 16th—House still standing. I and my son on guard day and night. Terrible fires in New York and Brooklyn—the island illuminated by them. Mobs assembling at Stapleton and Clifton.

July 17th—Military, arms and ammunition sent down to protect the Island. Have not had my clothes off for three days.

July 18th—Wilson's men sent down to guard the Island. Negroes killed and beaten.

July 20th—Report of two soldiers being killed on the railroad by rioters.

July 21st—Two companies of 5th Reg. N. Y. sent down.

July 22nd—Two more companies sent down. Also 300 policemen to different parts of the Island.

September 11th—Pavilion Hill hotel burnt at 1 P. M. Great rejoicing by the people.

September 14th—Putting up another building on the Hill.

November 7th—Soldiers' barracks at New Dorp burnt.

December 5th—Fare raised to 10 cents. Much growling.

1864.

January 15th—So much ice in the bay the boats could not make the 11, 12 and 1 o'clock trips. No night boats until further notice.

January 18th—Only three trips to New York to-day.

January 19th—First trip from the Isl- and 11 A. M.

February 3rd—A large gang of rowdies came down to attend a dog fight at Factoryville. Back in 3 and 4 P. M. boats.

February 8th—A schooner loaded with hay off Stapleton on fire.

February 26th—Sale of ferry to Railroad Co.

March 17th—Spanish frigate (Carmen) left for Havana. This night Dr. Hollick's stable burned.

March 20th—New York legislative committee down to day to select site for a quarantining station.

March 27—26th Reg. (colored) left this day.

April 7th—Lot of rowdies down to-day. A dog fight.

May 30th—Sunday—Plenty of rowdies, pickpockets and their "ladies" up to Pavilion Hill to-day.

June 13th—Usual number of rowdies down to Pavilion Hill. T. Nesmith, policeman, severely beaten.

July 19th—Gave \$2.50 in currency for a gold dollar.

July 22th—Newspapers raised to 5 cts. on the island.

July 28th—9 30 P. M. a very large meteor burst at Fort Hill, leaving a streak of blue and yellow in the sky for nearly five minutes.

August 2nd—Mosquitos by the million.

August 28th—Mosquitos so thick on the island that people had to leave and go to New York. Many wore nets over their heads and there were fires burning in the streets all afternoon and evening. St. Julien hotel lost many of its boarders and the same with Peteler's. Many store-

keepers closed their stores.

September 6th—Sold this day \$13.00 in silver for \$26 44 in bills.

October 11th—Large gang of roughs down to witness a prize fight. Were disappointed and amused themselves firing pistols at each other.

November 3rd—Reformed church, Brighton Heights, dedicated to-day. Church crowded.

December 17th—Had to pay 25 cts. per lb. for pork and 25 cts. for turkey.

MISCELLANEOUS MEMORANDA.

Mr. Arthur Hollick stated that the mastodon's tooth, shown at the March meeting, had been submitted to Prof. R. P. Whitfield, of the American Museum of Natural History, who had kindly identified it as a 6th molar of *Mastodon gigantea Americanus*. It contains the 2nd, 3rd and 4th crests. The 1st crest and heel on 5th crest are broken off.

Dr. N. L. Britton reported the recent discovery and identification of three species of *Barbarea* (winter cress) on the Island. Only *B. vulgaris* R. Br. had been previously recognized and listed, but it is quite possible that *B. stricta* Andr. was equally common and had merely escaped notice on account of its close similarity. They grow together and may be distinguished by the spreading pods of the former as compared with the appressed pods of the latter. The third species, which is much less plentiful, is *B. præcox* (Willd.) R. Br. They were all found near Sandy Brook, Pleasant Plains, on May 13th.

The president designated Mr. Arthur Hollick to edit the current issue of the Proceedings.

On motion the Association adjourned until the second Saturday in September.

PROCEEDINGS

OF THE

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

VOL. IV. No. 9.

SEPT. 8th, 1894.

Meeting held at the residence of Mr. William T. Davis, Stuyvesant Place, New Brighton.

Mr. Davis exhibited various specimens connected with the recent visitation of the periodical Cicada, including mud cones and pine branches in which eggs had been laid, and read the following paper :

THE SEVENTEEN-YEAR LOCUST ON STATEN ISLAND IN 1894.

It was stated in these Proceedings for April, 1894, that periodical Cicada pupæ had been found on the 8th of the month, under some boards on the edge of Old Place meadow, where they had erected cones of earth above the damp ground, the boards not lying sufficiently close to prevent their construction. On the 22d of April many pupæ were found in the woods along Willow Brook, under stones, logs and the chips about the stumps of trees cut down in the winter. Many more were without protection of this kind, and their presence was indicated by the small irregular cones of earth among the dead leaves. A heavy foot-fall near the cones was sufficient to cause the insects to retreat, but if they were approached silently and suddenly knocked over, their constructors would be found within. Some of the cones were three inches high, but the average was about two.

Mr. S. S. Rathvon, according to Packard's "Guide to the Study of Insects," found that the Cicada pupæ built their cones in low, wet localities, so that they might climb into the dry upper chambers and await their approaching change.

Upon the Island the cones were only discovered in moist places and the above seems to be an ample reason for their construction. Prof. J. S. Newberry, in the "School of Mines Quarterly," vol. VII, No. 2, January, 1886, gave an account of the cones constructed in the cellar of a house in Rahway, N. J., in May and June, 1877, and as causes the dark condition of the cellar and the desire of the insects to work up to daylight. Prof. J. A. Lintner, in the "Cultivator and Country Gentleman" for June 7th, 1894, also figures and describes some cones found sixteen miles south of Albany, but does not assign any reason for their construction.

On May 19th, many perfect Cicadas were found on the Island at Clinton avenue, New Brighton. They had emerged during the previous six or seven days and scores of them had already fallen a prey to the English sparrows. On the 20th came the severe storm, that by its long continuance so bruised the young leaves on the easterly side of the trees that they have borne traces of its force all summer. This storm also proved very disastrous to the early Cicadas. Many of them were killed and others permanently damaged. On the exposed side of Todt Hill the cripples were particularly abundant. In point of reputation this storm also did the Cicadas much harm, for it was not uncommon to hear them accused long before they had laid any eggs of causing the withered condition of the leaves, the fact that said withered leaves were confined to the easterly side of the trees making no difference.

By the 30th of May they had commenced

to sing in some numbers and by June 12th they were very abundant. On the 16th of June my companion and I found them to be quite rare on the sandy ground at Watchogue. We saw none and only heard three singing, whereas we had left thousands a quarter of a mile behind on the less sandy soil. This matter of distribution was found to be an interesting point even in so small an area as Staten Island. On certain hills and in particular patches of woodland Cicadas occurred by the million, while a short distance away, with apparently unaltered conditions, they would be but few in number. One of the most infested districts on the island was along the Clove road in West New Brighton, and about some of the trees the pupæ shells became so numerous that they completely hid the ground itself. At dusk the sound of the many insects crawling up the tree trunks was quite audible—a constant tramping—and particularly vigorous pupæ sometimes ascended the trees to a height of thirty feet. Many dead deformed individuals and others that had been killed by birds, dogs, etc., lay about these same trees, and as the season advanced gave forth an unpleasant odor.

On June 17th the first Cicada affected by the fungus, *Massospora cicadina*, Peck, was found. It was a male, and later several females were collected also attacked by this or a similar fungus. It has been recorded in the bulletin devoted to the periodical Cicada, No. 8 of the Department of Agriculture, that only males were found affected by *Massospora*, so that the exceptions mentioned are interesting.

Between seventy and eighty kinds of trees, bushes and herbaceous plants were noted in which the Cicadas had laid their eggs, and the list could no doubt have been greatly extended. Prof. Riley says: "The females deposit their eggs in the twigs of different trees, and though for this purpose they seem to prefer the oaks and the hickories, they oviposit in almost every kind of deciduous tree, and even in herbaceous plants and in evergreens." The limbs of the oaks and hickories show the effect of the Cicadas

ovipositing very considerably, as many of them are broken off by the wind and the brown withered leaves are conspicuous for the remainder of the summer, but there is no doubt that on the Island at least, the tree most sought after by the female Cicadas in which to deposit their eggs, was the white birch. The black birch and the sweet gum were also great favorites, both as depositories for the eggs and also from which to draw sustenance. It was no uncommon matter to see rows of Cicadas along the branches of a sweet gum, each insect with its proboscis stuck into the bark. The sweet gums and the white birches did not exhibit a great many dead leaves in spite of the attention paid them by the Cicadas, but it was quite otherwise with the horsechestnut. In this tree the Cicadas often laid their eggs in the petioles of the large leaves, which caused them to die shortly after, and the tree in consequence appeared to be greatly damaged. When the eggs were laid in cherry trees, the gum exuded at each scar, there often being a globule as large as a pea.

Prof. Riley records the observations of Mr. R. H. Warder, of Cleves, Ohio, who found Cicada eggs in various evergreens, but in none of the species of pine. On Richmond hill Mr. Leng and I discovered the eggs in the common cedar, and in Mr. Leng's garden, at West New Brighton, they had attacked sparingly a cultivated pine, resembling in many respects our *Pinus inops*. In the branches of a white pine (*Pinus strobus*), growing near Four Corners, a few eggs had also been deposited. It is probably the unpleasant sticky sap that protects the pine, as it seems also to be in the case of the smooth Sumach, *Rhus glabra*. Though the Cicadas were found sucking the sap of this bush, yet they rarely tried laying eggs in its tissues. When the bark was punctured, the milky sap hardened in glazed patches on the surface. *Rhus copallina* has a more liquid sap, and the Cicada eggs were slightly more plentiful in this species in consequence. *Rhus radicans*, the poison ivy, was also found to contain Cicada eggs, but it, with some other species, such

as *Ailanthus glandulosus* and *Catalpa bignonioides* was not a favorite. Eggs were also found in *Baptisia*, *Pycnanthemum*, *Cimicifuga*, *Scrophularia nodosa*, *Aster cordifolius*, *Solidago rugosa*, *Solidago Canadensis* and the cultivated grape. In the plants with a pith, such as the golden rods, care was generally taken by the insect to place her eggs near the surface in the woody and moist parts, whereas they would have been deposited in the center of a white birch twig of the same size.

Certainly the Cicadas tried many experiments in egg laying. I found where one had endeavored to make use of the very hard stem of the cat brier (*Smilax rotundifolia*), and in another case an inexperienced female had thrust her ovipositor in various places throughout the entire length of an *Angelica villosa* stem, only to find that it was hollow.

About the third week in June the Cicadas commenced to die of old age, but on July 8th they were still singing in one place on Richmond hill. The males were in the trees and the females fairly numerous in the low bushes by the road side. Mr. Leng and I saw about fifty females but no males, the latter we only heard singing in the trees. By the following Sunday, July 15th, all of the seventeen-year Cicadas appeared to be dead.

In conclusion it may not be out of place to mention a few observations made off the island. In Westchester county the insects appeared in some numbers at New Rochelle on the sound and also at Yonkers on the Hudson. At an intermediate point, namely along the Bronx river at Bronxville and Tuckahoe, no Cicadas could be found on the 10th of June. At Croton on the Hudson their distribution in colonies was a marked feature. On a certain hill embracing a peach orchard they were particularly abundant, whereas across the Croton river, not far away, they were almost a novelty.

Mr. Walter C. Kerr presented the following memorandum on

THE GROWTH OF *HYPOXIS ERECTA* AFTER FIRE.

It is of passing interest to note the

plants that spring from a charred surface recently burned over and there are some which we quite miss if not found on such areas.

On September 3rd, while passing west of the rail road track between Annadale and Huguenot, a small burned space scarcely thirty feet square was observed, and it would have been passed quite unnoticed had it not been for an abundant growth of *Hypoxis erecta* in full bloom, transforming it into a flower garden. The brilliant yellow of the blossoms on the black background, and their freshness in the midst of the black surroundings, made a picture of unusual beauty, framed in the full foliage of golden rods and asters. It may be that the interest it aroused was chiefly artistic, but even as such it may be indulged a word of mention.

MONMOUTH BATTLE GROUND.

Mr. Ira K. Morris reported that on behalf of the Association he had attended the meeting of the National Editorial Association on Monmouth Battle Ground, on July 4th, the object of which meeting being to select a national park, and to locate and mark, by suitable monuments, all points of interest on that historic field. The National Editorial Association voted unanimously to use every endeavor to secure a national park at that place. Historical addresses and patriotic songs made the brief session held in the Old Tennent Church an event long to be remembered by all who were present. The British troops which fought at Monmouth were those which encamped on Staten Island. Sir Henry Clinton, who commanded, used to occupy the Old Clarke Homestead (still standing) at New Dorp, as his headquarters, and later when he succeeded Sir William Howe, as commander-in-chief of the British forces in America, he occupied the Old Rose and Crown, Lieutenant-Colonel Monckton, of the First Battalion of Grenadiers, who was one of the most popular officers of the British Army, and whose name is indelibly linked with the history of Staten Island during the memorable Revolution-

ary period, was killed at Monmouth, and when Clinton retreated from the field during the night Monckton's body was left with the Americans. It was interred near the entrance to the Old Tennent Church, which was used as a hospital during the battle, and for many years the grave was unmarked. Then a Scotch school teacher, employed in the neighborhood, who had known the Monckton family in their home, erected a wooden slab at its head, the inscription on which I remember reading in my boyhood. Faded and worm-eaten, the old slab long since crumbled to the ground. A year or so ago a neat marble stone, bearing an appropriate inscription, was erected in its place, by a gentlemen who visited the battlefield, and it will long continue to be one of the points of interest to those who visit that famous place. The main points of interest, outside of the cemetery, were marked for the occasion by small flags, such as where Washington and Lee met, where Washington remained on the night after the battle, where Monckton fell, etc. The story is a long one—too long to be told here, and I close by saying that I gained many points of interest that will assist us in carrying out our plans to mark the historical points of Staten Island.

PROCEEDINGS

OF THE

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

VOL. IV. NO. 10.

OCT. 13th, 1894.

Meeting held at the residence of Dr. C. W. Townsend, St. Mark's place, New Brighton. In the absence of the president Mr. Thomas Craig was elected chairman, *pro tem.*

The committee on binding the library made a report of progress to the effect that \$105.00 had been received in subscriptions; that 121 volumes had been delivered to the binder and that about 30 more would probably be ready during the present month, which would complete the binding of the most important serials to date.

The secretary reported the following new exchanges of publications effected: Belfast Naturalists' Field Club; Folkstone Natural History and Microscopical Society and Linnæan Society of New South Wales.

Mr. James F. Rice, New Dorp, was elected an active member.

The secretary announced that arrangements had been made, as usual, for the annual field day on Election Day, with the Torrey Botanical Club, of New York, due notice in regard to which would be sent to each member.

Mr. Ira K. Morris read a paper, illustrated by engravings, on the Centennial of Richmond County's Third Court House, which will be issued as a separate number of the Proceedings.

Mr. Arthur Hollick exhibited specimens of limonite iron ore containing plant remains and read the following paper:

PLANT REMAINS IN LIMONITE, FROM
THE MORaine AT CLIFTON, AND
THEIR SIGNIFICANCE.

These specimens were recently found while examining the gravel pit on the Fin-

gerboard road from which so much material of interest has already been obtained.

The occurrence of limonite, as we all know is one of the well-marked features of our serpentine hills, and, where it is in sufficient amount has been mined as an iron ore. The old, abandoned diggings may be seen at Four Corners, Todt Hill, in the vicinity of the Clove Road and to a limited extent on Richmond Hill, where the rock is jasperoid in its character. In all these localities it is of course in place and seems to occupy basin-like depressions in the serpentine.

On Todt Hill the ore was not removed by glacial erosion—the moraine lying to the north. Over the other areas, however, the effects of glacial denudation and transportation are conspicuous. A well-defined trail of the jasperoid ore may be traced from Richmond Hill across the fields to Giffords, and on Giffords Lane and other highways in the vicinity, boulders of it constitute quite a feature in the stone walls—the red color contrasting strongly with the prevailing gray of the other rocks.

A short distance north of Oakwood station there is a mass of limonite and serpentine, forming a hummock in the moraine, which might readily be mistaken for a small spur of the serpentine ridge. In fact I so considered it many years ago and apparently others did also, for there are indications of mining, or at least prospecting having been tried, and the conditions are so much like those of the parent locality that a colony of characteristic plants became located there, as I reported at the time when they first came to my attention.*

Everywhere in the moraine south of the serpentine ridge limonite occurs in greater or less abundance, but only in the Fingerboard Road gravel pit have I found it to contain plant remains. To be sure we have never searched very closely with this object in view, and in the locality where we might most reasonably expect them to occur—the unglaciated Todt Hill area—the ore has nearly all been removed for economic purposes.

According to our knowledge of the direction of glacial movement over Staten Island the morainal material in the vicinity of the Fingerboard Road must have been transported from the direction of the Clove Road, in which locality also the bulk of the ore deposits have been mined out. This is likewise the case at Four Corners, while at Richmond the jasperoid character of the ore is not favorable to the preservation of plant remains. We therefore do not know of such remains in any of our limonite localities. Nevertheless, that these specimens are of Staten Island origin is abundantly proven by the fact that associated with them in the gravel pit are quantities of serpentine and “yellow gravel,” the characteristic associates of the ore where it occurs in place and undisturbed by glacial action, as on Todt Hill, and which do not occur to the north of us.

In addition to the general interest of the discovery these specimens are of considerable significance from several points of view. Limonite is a swamp deposit, as its common name “bog iron ore” indicates, and it was evidently formed in the depressions of the serpentine when these were swamps or shallow pond holes. These plant remains would therefore represent the vegetation which flourished there at the time when the limonite was forming. Under these conditions we would naturally expect to find swamp or aquatic plants represented, and such is the fact. The bulk of the fragments are *Equisetum* stems, in many instances beautifully preserved, showing the joints, longitudinal striations and even the sheaths. So far as I can judge, from an examination of

the specimens, we would not be justified in separating them from our living species *E. hyemale* L.

The exact geologic age of these limonite deposits is a matter in regard to which we are yet in some doubt. They are of course pre-glacial and the presence of unmistakable “yellow gravel,” (Lafayette?), frequently consolidated by the limonite into conglomerate or sandstone, indicates this as the horizon to which they may be referred. This view is greatly strengthened by the evident modern character of the included vegetation, which is apparently the equivalent of that known in the “yellow gravel” of New Jersey, at Atlantic Highlands and Bridgeton, at which localities more than three-fourths of the plant remains discovered are clearly referable to species now living in the eastern United States.

Finally, I wish to call attention to a paragraph in our proceedings for February 18th, 1893. It refers to the discovery of a piece of ferruginous sandstone containing leaf impressions, on the serpentine ridge, near Egbertville. At that time I had not found any plants in our limonite nor had I definitely connected the limonite with the “yellow gravel,” so the discovery puzzled me and I was content to say: “It is possible that it may have been brought to the place where it was found by human agency, but if not its occurrence there is more or less of a problem which future discoveries may solve.” The “future discoveries” have now come to pass and we are able to deduce the rational conclusion that the specimen in question represents a fragment of “yellow gravel” sandstone from some old limonite deposit which has been either entirely eroded by glacial action or else may be yet in existence in the vicinity where the specimen was found, but hidden from sight by the moraine.

The chairman designated Mr. Ira K. Morris to edit the current issue of the proceedings.

*“Relations between Geological Formations and the Distribution of Plants,” Bull. Torr. Bot. Club, VII, (1880) 14, 15.

PROCEEDINGS
OF THE
NATURAL SCIENCE ASSOCIATION
OF STATEN ISLAND.

VOL. IV. NO. 10.

(SPECIAL NO. 18.)

OCT. 13th, 1894.

CENTENNIAL OF RICHMOND COUNTY'S
THIRD COURT HOUSE.

BY IRA K. MORRIS.

When the old Court House at Stony Brook, (erected in 1683) was finally abandoned, in 1729, the County Seat was established at Cucklestowne, (then changed to Richmond Towne), where the County Goal had been erected in 1710, (the Old Red Jail, still standing.)

The County Courts had been held for a number of years in various parts of the county, not infrequently at the residences of the Judges, or of other prominent citizens. Convenient hotels were frequently the scene of the County Court; chief of these were the Rose and Crown, at New Dorp; Cucklestowne Inn, at Richmond; Bull's Head Tavern, at Bull's Head, and a number of similar places.

A County Court House was, however, erected in Richmond some time between the years 1729 and 1735. In what part of the little hamlet it was located there is, so far as I am aware, no authentic record. In conversation with old citizens and the searching of faded documents I am led to believe that the building was located where the Richmond County Hall stood or many years, and where the hall of the King's Daughters now stands. Some claim that it stood a hundred yards or so down the Fresh Kill road; but it is safe to assume that it was directly opposite the County Jail, at the junction of the two main King's highways.

Tradition gives two pictures of the old building. One is that it was a frame structure, shingle-sided and with gable end to the road; the other that it was built of stone in the familiar Holland style of architecture of that day. The latter seems to be the more reasonable, because for many years during the early part of the present century a considerable portion of such a building stood on the spot indicated. It was removed at the time of the erection of Richmond County Hall, in 1822.

The story comes down to us that when, on the morning of the 4th of July, 1776, a battalion of Grenadiers marched into secluded little Richmond, the County Court was in session. Benjamin Seaman, the County Judge, was an ardent royalist, and "on behalf of His Majesty's Court of the County of Richmond, he directed the Sheriff, Thomas Frost, to welcome His Majesty's troops to the County seat."

Sheriff Frost was not in sympathy with the cause of England, and positively refused to obey the instructions of the Court; whereupon Judge Seaman directed that he should be summarily punished for contempt of Court! The Sheriff was very popular, even among those who differed with him on the vital question of the day—rebellion against the King, for the purpose of establishing the indepen-

dence of the colonies. Hundreds of citizens had assembled in the village, and notwithstanding the presence of the King's troops, there was a spontaneous appeal to Judge Seaman that Sheriff Frost should go unpunished.

Judge Seaman was evidently too shrewd a reader of human nature to ignore the popular demand, and he acquiesced as gracefully as circumstances would permit.

For some reason, unknown to the writer, Frost changed his opinion shortly afterward, and became one of the most radical Tories on Staten Island. He was indicted for cursing the "rebels" and otherwise acting disloyally, when the war was over, and his trial for the same was the first one under the new county government. He pleaded guilty, but there is no record of the result.

When the County Court adjourned, on July 4th, 1776, those who were present witnessed the last session of a judicial tribunal under the royal regime, for "the Court of His Majesty, George III., King of Great Britain, etc., by the grace of God," was known no more to the people of Staten Island.

The Court House, the County Jail, the Cucklestowne Inn, and another public house that stood on the Fresh Kill road, St. Andrew's (Episcopal) Church, the old Dutch (Reformed) Church, and a number of other buildings in and around the village were at once more or less occupied by the British soldiers. In the course of a few days two brigades of troops were encamped at the County Seat.

The protection of County records was a question that interested the residents at that time far more than that of the independence of the colonies, for the presence of such a vast body of British troops on Staten Island—about 25,000 in all—caused the strongest patriotic hearts to grow faint and to feel that hope was useless. Every day for weeks citizens repaired to the Court House and carried away armsful of public documents, that they might be preserved in their homes until peace was re-established.

British officers occupied the Court House—one of whom for a time was

Captain, afterward Major, André—and the documents were by their orders gathered up and dumped in a rude heap out of their imperious presence!

During the war a number of attempts were made to capture the British forts on Staten Island, and near the close it was thought by the British commander that Lafayette was arranging, with a large force of Continental troops, to make a desperate attack on Richmond. Lieutenant-Colonel Simcoe, temporarily in command of the post, issued an order that every public building should be burned to the ground "rather than surrender to the French adventurer?"

One dark winter's night one of the Hatfield Tory band, which rendezvoused at Bull's Head, mounted on a swift horse, dashed down the steep side of Richmond Hill into the little village. He told the British commander that General Sullivan had landed on the North Shore with a large body of men, and that he was coming to Richmond. All was excitement at that post, and re-enforcements were sent from the headquarters of the army at New Dorp.

Tory spies continued to report all through the night and until daylight. General Sullivan's movements being greatly exaggerated, Colonel Simcoe renewed his order to "apply the torch, if necessary."

It is evident that some enthusiastic subordinate thought it quite necessary, for in a very brief time nothing but the thick stone wall of the Court House was left standing, and many of the most valuable records of the County had vanished in the flames.

The Dutch Reformed Church, which stood on the corner of the property now owned by Mr. William Flake, was also burned to the ground, excepting a portion of its stone walls, "because," the British said, "it was a rebel church." This church was rebuilt in 1808, and abandoned about ten years ago.

Throughout the entire period of the Revolution there was no systematized county government. Supervisors were elected each year; but they had little to

do, as the Island was under martial law. Westfield.

It was practically the headquarters of the British forces in America throughout the period of hostilities. Devastation and ruin everywhere marked the Island. Redoubts, trenches, huts and piles of charred timber and ashes that were once "rebels' homes," told the story of the long and bitter conflict. The sudden lull that came after the long storm that had raged in every home and every heart, left the people in a dazed and demoralized condition. Many of the leading citizens of the Island still clung to loyalty, and instead of attempting to reorganize the local government, gathered their families together and migrated to Nova Scotia, Canada or England. Those that remained behind were still divided in opinion, and the quarrels of the Revolution were carried on even for generations!

More than half of the population of the Island at the time were either English or of English descent. But there were those among them who remained at their posts as citizens, and who were actuated by pure and patriotic motives. Many of them had been forced to bear arms for the King, and had deserted his cause when opportunity afforded.

In 1781 a temporary county government was effected which was, a year later made permanent. Joshua Mersereau was elected to the Assembly.

The first court officers to serve under the new government were as follows: David Mersereau, Hendrick Garrison, Peter Rezeau, Anthony Fountain, John Wandle, Gilbert Jackson and Lambert Merrill, Associate Judges; Abraham Bancker, Sheriff; John Lewis, Coroner; Daniel Salter, James McDonald, John Baker and Abraham Burbank, constables. The first act was to read the commissions of the several officers. The first civil suit on the calendar was that of Richard Housman vs. Henry Perrine, trespass; damage £50.

In 1785 the Board of Supervisors started to work in earnest. The board consisted of John C. Dongan, of Casleton; Gozen Ryers, of Northfield; James Guyon, of Southfield, and Peter Winant, of

Obstacles of every conceivable shape arose to impede the progress of the new county government. The poverty of many of the citizens and the disloyalty of others were the most serious. In 1784 the county taxes were \$1,037.50; but in the next year the State made excessive levies, and many properties were sold to meet the demands.

For this reason the County Courts were held in various places throughout the county, the principal one, however, for the trial of criminal causes being in the old Cucklestown Inn, near the (Old Red) County Jail.

After the re-establishment of the county government there was an element on the Island that seemed to have no interest in its progress, unless they could benefit by it personally. Some of the Tories, even, who had aided the royalists in every possible manner, brought in bills against the new government for losses they claimed to have sustained during the war.

In 1787 Benjamin Micheau, the County Treasurer, announced to the supervisors that he had been robbed. The manner or amount were not stated. The records stated that Mr. Micheau applied to the Legislature for a special act for his relief, which authorized the supervisors to make a special levy on the taxpayers and refund the money. Several meetings were held and considerable testimony taken. The verbatim report of the supervisors was as follows:

"After having heard all The Proofs and alligations respecting the segested Robbery as aforesaid, and having duly and deliberately Considered the Evidence and alligations as the Law Directs, Do not Conceive That we the supervisors are authorized to raise the Money as Directed by said Law for the relief of Benjamin Micheau Late Treasurer of the County aforesaid. In Testimony Whereof we have hereunto set our hands this twenty Eighth Day of June, 1788. Joshua Mersereau, Richard Conner, John Wandle, Cornelius Cole."

Considering the meagre population, the burdensome taxes and the general financial depression that pervaded the Island,

the building of a Court House was a question of serious importance. The people were divided and very much in earnest. At first the Supervisors considered the proposition to "establish a lottery in ye Bowery for the purpose of raising funds," that being the popular mode of financiering at that time; but the scheme was never carried into effect.

Many public meetings were held throughout the county, with a hope of creating public sympathy for the movement to erect a Court House. Some favored returning the County Seat to Stony Brook and enlarging the old Court House and County Jail, which were one building.

The question was agitated until 1791, when by a vote of the people, in a three-days' election, it was decided to build a Court House. It is interesting to note the population of the Island at that time:

	Males.	Females.	Slaves.
Northfield,	474	436	194
Westfield	473	478	286
Castleton,	401	398	170
Southfield,	334	341	289
	1,682	1,653	939

Total population, 4,274.

In November, 1791, the Board of Supervisors, consisting of Richard Conner, of Castleton; Cornelius Bedell, of Northfield; George Barnes, of Southfield, and Cornelius Cole, of Westfield, met in the Cucklestown Inn, and by a unanimous vote decided to "proceed with the building of the Court House, as soon as the contract can be perfected and the weather permits." To make the movement popular, in the face of considerable opposition, a public meeting was held in Richmond, by those in its favor, and a strong resolution was adopted, endorsing "the prompt action of the Board of Supervisors."

I can find no further record as to action in the matter until midsummer of the following year, when the following appeared in the proceedings of the Board of Supervisors:

"July 7: 1792 At a meeting of the supervisors Together with the Judges of the Court of Common Pleas for the County of

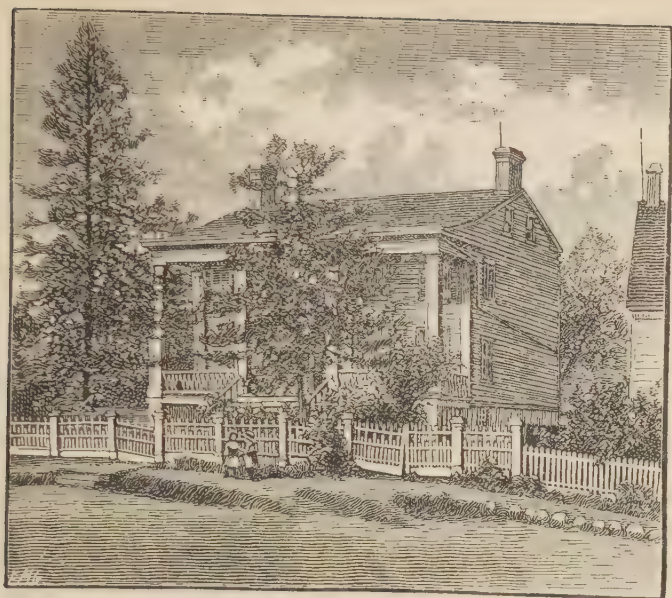
Richmond the 26th of June 1792 Lawrence Hillyer and Joseph Barton Jr. were unanimously appointed Commissioners to Superintend the Building of a Court House in the Town of Richmond on the Lott of ground given by Doctor Thomas Frost, and Thomas Frost having since been appointed a Commissioner to be with the said Lawrence Hillyer and Joseph Barton to Superintend Said Court House and to Advertise for Undertakers to receive proposals that may be Consistent with economy and the Interest of the County.

"Richard Conner, clk Supervisors."

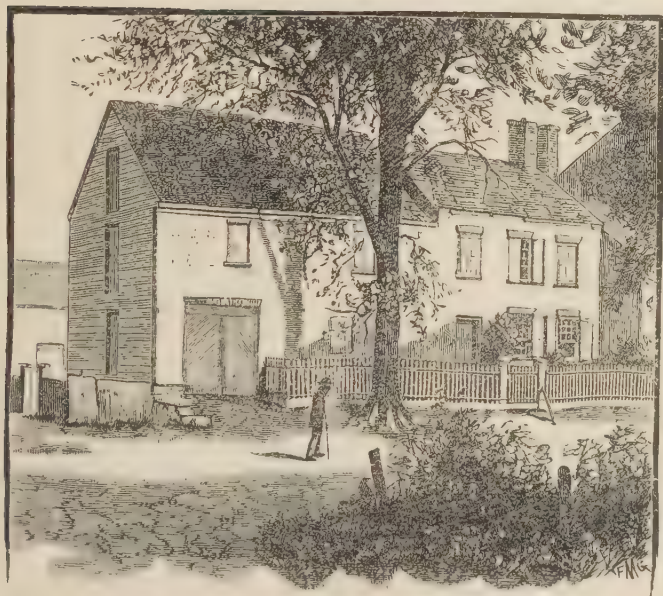
In that same year, (1792), a tax of £315, (\$787.50), was levied upon Richmond County to defray the expenses of building a Court House, and the sum of £15 was paid to Dr. Thomas Frost for the "Lott" which the records state he had given to the county. Late in the same year another tax of £84 was levied for completing the Court House. The land in question is located a few yards west of the Old Red Jail, on the north side of the Fresh Kill road. It took two years to complete the building.

In October, 1794—just one century ago this month—the Board of Supervisors met in the "new Court House" for the first time, and accepted the building on behalf of the people of Richmond County. The board consisted of Abraham Burbanck, of Castleton; Cornelius Bedell, of Northfield; Cornelius Cole, of Westfield; and George Barnes, of Southfield.

The building differed very materially in appearance from the present. An old resident of Richmond, describing it to the writer, said, "it was really a beautiful little Court House." It was two stories high and surmounted by a belfry, the bell which it contained being the one now in possession of this Association. Its sides were covered with shingles, same as at present. It stood close to the street and its first floor was almost on a level with the ground. The first floor contained two rooms—a small one at the entrance and a large one which was used for many years as a public hall, and there are citizens still living in the country who used to attend "singing school" there in the old days. It was also occupied by the Grand and Petit Juries, while Court was



THIRD COURT HOUSE, 1794.
NOW THE RESIDENCE OF ISAAC M. MARSH, ESQ



OLD RED JAIL, 1710.

CLERK'S AND SURROGATE'S OFFICES,
1827.

in session, and the records saved from the conflagration of the old Court House during the Revolution found a resting place there. The Court room occupied all of the second floor, and was arranged something similar to the one now in use, but was not quite so large and pretentious! The stairway leading to the Court room ran up from the left side of the entrance.

The first important trial held in this building, of which there is any record, occurred in 1815. On the 27th of October of that year, Bornt Lake, who resided on the Amboy road, a short distance south of the Black Horse Tavern, while on his way home from his father's house on the same road, was met by his next door neighbor, Christian Smith. They had been on bad terms for a long time, and had frequently quarreled, but this was their last one. Smith carried a gun and shot and killed Lake, and left him lying in the road in front of his own house.

Smith immediately went to another neighbor, John Jacobson, told him what he had done, and asked his advice relative to surrender or escape. It is evident that Jacobson did not interfere, as Smith wandered off to the woods, where he was found later in the day by Sheriff Perrine, arrested and taken to the Old Red Jail. He did not deny the crime; but justified himself by the plea that Lake was trespassing on his property, as he had done many times before, notwithstanding he had been warned.

Smith was indicted and brought to trial. The prosecution proved a clear case of murder, and there was no denial. The defence was justification. Judge Spencer, of the Supreme Court, presided at the trial, and charged that the law was strongly against the prisoner. He said that "if the murdered man had trespassed upon the property of the prisoner, the law afforded ample redress, and he had no right to take the law into his own hands and redress his own wrongs." The jury, however, disagreed with the judge and acquitted the prisoner.

Everybody who knew anything about

the trial was surprised, and Judge Spencer became indignant. In discharging the prisoner from custody he said: "The jury have seen proper to Find you not guilty. How they have arrived at such a conclusion, in the face of the law and the facts, surpasses my comprehension; but I warn you that there is another tribunal before which you must appear hereafter to answer for your crime, and where you will not have the benefit of a Staten Island jury."

As a matter of course the verdict was the subject of conversation for a long time in the county, and it is said that one of the jurors explained the matter in the following manner: "If we convict the prisoner the Judge will give him two or three months more to live, during which time the county will be obliged to feed him and to keep his cell warm, which would cost a good sum of money. If to this is added the cost of building a gallows, the Sheriff's fee for hanging him, the cost of burying him, the expences will amount to a hundred or a hundred and fifty dollars, and all of which will have to be raised by taxation; but if, on the other hand, we say 'not guilty,' every dollar of this amount will be saved."

In the fall of 1823 there was much excitement in the little village of Richmond, in consequence of a mysterious death, which the county officials were investigating in order to ascertain if murder had been committed.

Lying opposite the Quarantine, (Tompkinsville), was a United States man-of-war. Early one morning a sailor was found in a dying condition, and could not tell how he was injured. A son of the commanding officer, who was an ensign, was known to have had words with the sailor during the night, and suspicion, consequently, rested upon the young man.

It was several days before the matter was reported to the Richmond County authorities, and it was then only incidentally. Two sailors, who had come on shore, and had lingered too long at their cups, were discussing the matter, and thus gave the clue. The sheriff and two or three deputies went off to the vessel

and reported to the commander what they had heard, and respectfully demanded the surrender of the young ensign. Various excuses were made, but the Sheriff would accept nothing short of the accused himself. He was finally surrendered and taken to Richmond, where he was placed in prison. For days after that the little County Seat was the scene of brilliant uniforms, as many naval officers remained there during the progress of the inquest, which was held in the Court room of the County Court House. The inquest continued for nearly a week, and ended in the acquittal of the defendant by the jury; but not in the public mind, for the testimony was of a very damaging character. I once conversed with a member of the jury, and he told me that sympathy had a great deal to do with the formation of the verdict.

The Hon. Ogden Edwards, grandson of of the famous divine, Jonathan Edwards, and cousin to Aaron Burr, resided in the old Dongan Manor house at West New Brighton for many years, and is the only Circuit Court Judge that ever made his home on Staten Island. He was a brilliant man, and fully sustained the honorable reputation of his illustrious ancestors. Judge Edwards presided in this Court House for a number of years. In 1828 I find by the files of the Richmond County *Republican*, that he directed the editor, Charles N. Baldwin, arrested on a charge of contempt of Court, the latter having criticised rather harshly the action of the Judge in assuming what he (the editor) believed to be the prerogatives of Governor DeWitt Clinton. I am informed from other sources that friends interceded and Editor Baldwin escaped punishment.

It is related that while Judge Edwards was presiding one day at Court in this building, he sent a young man to prison for speaking disrespectfully of his (the witness's) mother. The question was asked:

"Is this woman your mother?"

"They say so," replied the witness, carelessly.

"They say so!" snapped the Judge;

"did you ever hear it contradicted, or even questioned?"

"N-o-o," replied the witness, evidently feeling that he had made a mistake.

"Then, as a man," added the Judge, "you have no right, by word or act, to cast any suspicion upon the character of the woman whom you have always called mother, and who has given so many years of suffering and toil for you. Leave the witness's chair; you are unworthy to be heard in this Court! Sheriff," continued the Judge, "commit this young man to the County Jail for ten days for contempt of Court."

Near the close of the first quarter of the present century, when the "tax quarrels" had in a measure subsided, and the Island was comparatively prosperous, it became apparent that better provisions should be made for the protection of the county records. In fact, the County had outgrown the little Court House, and another great question faced the taxpayers. Every interest of the County demanded proper quarters for the County Clerk and Surrogate. Meetings were held in the County Court room, and the subject was advanced and opposed. The discussions were of a very animated character. Beside native talent, paid speakers were brought down from the metropolis to argue for and against. Some of the taxpayers came to blows. The result I leave for the original minutes of the Board of Supervisors to tell:

"1827, May 5th. At a meeting held this day, present Harmanus Guyon, John Totten and Nicholas Crocheron, supervisors, also Richard Crocheron, Esq., James Guyon, Esq., and Walter Betts, Esq., commissioners appointed according to law passed April, 1826, an act to provide for Building a Fire proof Clerk and Surrogate's office in the County of Richmond, whereby it is made the duty of the Supervisors at their annual meeting to cause to be levied and collected a sum not exceeding One Thousand five hundred Dollars over and above the expense of Collecting the same, for the purpose of building a fire proof Clerk and Surrogate's office for said County, to be located in such part of said County as the Judges of Said County, or a majority shall direct, and in which all the public Records and Papers belonging as well to

the Clerk as the Surrogate of the said County shall be kept, and the said Judges have fixed Upon the Cite of the Old County-house on the East side of the Goal for the locating the same."

The County house was removed to the site of the present residence of Dr. Isaac L. Millsbaugh, on Richmond road, and the "fire-proof" building was erected without delay. The "Goal" alluded to is the Old Red Jail, and the Clerk's and Surrogate's "fire proof office" built upon the "Cite" of the old County house is the small two-story brick building still adjoining the old jail. The exact cost of the fire-proof building is not known; but on the following year bills for material and lumber were audited to the amount of \$941.08.

In the following year, 1828, "in consequence of the ill health of the County Clerk, Jonathan Lewis," the supervisors ordered that all papers, books, etc., in the Clerk's office should be turned over to the Deputy County Clerk, Abraham Auten.

The whipping post, a relic of remote Colonial days, stood on the site of the present village school house. During its existence many petty criminals were there punished, the majority of whom were sentenced after trials in the County Courts. The date of its disappearance I have been unable to learn; but mention is made of it as late as 1821.

The following citizens of Richmond County served as Judges of the County Court in this old building: Paul Micheau, 1794; Gozen Ryers, 1797; John J. Murray, 1802; John Garretson, 1803; Jacob Tysen, 1823; and until it was vacated in 1837.

The following served as Sheriff in the same building: Benjamin Parker, 1794; Isaac Cubberly, 1796; John Hillyer, 1799; Jacob Crocheron, 1802; Jonathan Lewis, 1806; Daniel Guyon, 1810; Jacob Crocheron, 1811; Jacob Hillyer, 1813; Henry Perine, 1815; John Hillyer, 1819; Jacob Crocheron, 1821; Walter Betts, 1825; Harmon B. Cropsey, 1828; Lawrence Hillyer, 1831; Israel Oakley, 1834; Andrew B. Decker, 1837.

The office of District Attorney became an elective one in 1818, consequently there were but three elected to serve in

that capacity in this Court House, viz.: George Metcalfe, 1818; Henry B. Metcalfe, 1826; Thorn S. Kingsland, 1833, and until vacated.

About 1835 Staten Island had a great boom, which continued until the memorable financial panic of 1839. But in the meantime the promise of prosperity was so great that another Court House was built, its original cost being \$4,000. When this was completed, the Board of Supervisors, consisting of Nathan Barrett, of Castleton; Jacob Simonson, of Northfield; Joseph Segguine, of Westfield, and Samuel Coddington, of Southfield, met in their new room, (now the Under Sheriff's parlor), on the 18th of November, 1837, and adopted the following resolution:

"Resolved, That the old Court House in the Village of Richmond, and the lot on which it stands be offered at auction, at the Richmond County Hall, in said village, on Saturday, 17th day of December next, at two o'clock P. M., if not previously disposed of at private sale."

The premises were purchased by Walter Betts, who was at that time one of the most prominent citizens of the county and one of the leaders of the Whig party. He had been Under Sheriff, Sheriff, County Clerk, Supervisors' Clerk and Postmaster of Richmond, and was removed from the latter office by President Jackson in 1828.

Mr. Betts at once remodelled the old building, moved it back from the street several feet, built a basement under it, and converted both floors into convenient rooms, just as they appear to-day.

In 1860 the building was purchased by Mr. Isaac M. Marsh, who with his family still occupies it. Mr. Marsh was Under Sheriff and Sheriff for sixteen years, Police Commissioner for three terms, and also held various other offices of trust. He was one of the special Government contractors during the Rebellion, being appointed by Secretary Stanton.

The old house is in a good state of preservation, and, should no accident occur to it, will certainly stand for many years to come. Who can contemplate the changes that have come to Staten Island, since it was reared in the little County Seat, a century ago?

Richmond itself was for a long time the very centre of every social and business interest of the County. Its churches, its hotels and its stores were looked upon as the leaders in their particular sphere; but time and circumstances have brought changes to these historic surroundings, and the story of "fallen greatness" is told in the quiet seclusion of deserted streets and the devastation and decay which meet the eye at every turn.



PRESENT COURT HOUSE, 1837.

PROCEEDINGS

OF THE

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

VOL. IV. NO. II.

Nov. 10th, 1894.

Fourteenth annual meeting, held at the residence of Mr. Walter C. Kerr, Tompkins avenue, New Brighton. The president in the chair.

Reports of officers for the past year were read and approved, viz :

Secretary :

Number of members on roll at date of last annual report.....	46
Since elected.....	11
Resigned.....	0
On roll at date.....	57

Ten meetings were held, one of which was informal. Ten regular numbers and two special numbers of Proceedings were issued, which included a total of 47 pages.

Treasurer :

Receipts, including balance from last year.....	\$392.95
Disbursements.....	143.65
Balance on hand.....	\$249.30

Curator :

Number of additions to the collections	61
Classified as :	
Geology.....	38
Zoology.....	20
Archæology.....	2
Palæontology.....	1

In addition to the above, hundreds of specimens are in the individual keeping of members, which will be placed in the collections of the Association as soon as adequate accomodation can be provided. In the library there have been fifteen additions to our exchange list and twenty-nine donations. 123 volumes have been bound and the others thoroughly overhauled and an effort made to obtain, as far as possible, all missing numbers, in order to complete back volumes.

The election of officers for the ensuing year resulted as follows:—President, Walter C. Kerr; treasurer, Thomas Craig; secretary, Arthur Hollick; Curator, H. W.

Congdon; trustee, Wm. T. Davis.

On motion, the second Saturday evening of each month, except July and August, was designated as the time for holding the regular meetings of the Association during the year.

On motion, the subscription price for the Proceedings was fixed at \$1.00 per annum.

The president appointed Mr. Wm. T. Davis to attend to the mailing and distribution of the Proceedings for the ensuing year and Mr. Arthur Hollick to edit the current issue.

Mr. Geo. H. Pepper exhibited a collection of human and deer bones and charred wood, recently exhumed at Tottenville, and read the following paper :

A RECENT DISCOVERY OF INDIAN REMAINS AT TOTTENVILLE.

My previous paper of May 13th, 1893, contained an account of the indian remains exhumed on the premises of Mr. Joel Cole at Tottenville, and from the fact that these were found in a sandy knoll I concluded that it was probably the site of an aboriginal burying ground. I therefore sought and obtained permission from Mr. Richard Christopher to dig in the field adjoining the Cole property, in the hope that some remains might be found there.

On the afternoon of Aug. 10th last I broke ground about fifty feet from the building in digging the cellar of which the before mentioned specimens were found. About two feet down the surface soil ended and undisturbed sand was reached. Not a shell nor a stone was found after passing the surface soil limit.

I opened up a place six feet long by four wide and about six feet deep and then, not finding anything, desisted.

In crossing the field on my way home I marked a place with my spade for my next operations, which I expected would take place the following Saturday; but I was not able to resume my search until September 15th, when I commenced digging in the shade of a cedar tree that is situated upon a knoll eighty-five feet from the road and eighty-four feet from the Cole estate and within two feet of the place I had marked.

After digging down about three feet I noticed that the soil and sand were mixed and thus encouraged I renewed my efforts with the result that at a depth of four feet I found one of the objects of my search.

The first intimation which I received of the presence of a human skeleton was in uncovering the upper portion of a right femur, which I detached from the main bone with my spade; as soon as this was brought to light I laid aside my implements and commenced digging with my hands.

I soon uncovered the upper portion of the cranium, and in removing the earth from the sides I came to the femurs and tibias; these proved to be soggy, probably from the rain of the previous day, so extreme care was necessary in unearthing them, as they dropped apart seemingly from their own weight.

The skull was in a perpendicular position, the crown being up, and facing the north east.

At the base of the cranium there was a stone and upon this rested the inferior maxillary. A larger one also supported the head, but from their position one could readily see that they had been thrown into the hole carelessly and had not been placed there for any purpose. The femurs and tibias, with parts of the ulnas and radius were lying in a bunch on the north western side of the skull and the smaller bones were scattered about it.

From the position of the bones the body must have been buried in a sitting posture, with the head bowed forward and resting

upon the knees.

The skeleton is in about the same condition as some recently found at Trenton, N. J., the skull being the best preserved part and the femur next, the other bones having disintegrated to a greater or less extent.

The upper portion of the skull is in good condition—the frontal, parietal, occipital and temporal bones being intact; the right malar and sphenoid bones are missing.

The cranium is very interesting, having two marks on its surface which were probably made by tomahawk blows; one is in the center of the frontal bone and the other on the left parietal; they are both well defined, the one on the parietal being the last received, as the edges had just commenced to knit. Time had played havoc with the face, some of the bones being so thin that they broke when removing the sand with which the skull was filled.

The lower part of the nasal bone is missing and only a portion of the superior maxillary is left. This is on the left side and contains four molars. Of the inferior maxillary about three quarters remain, in the right side of which are three molars and the roots of a fourth.

The measurements of the skull are as follows: The anterior-posterior axis is seven and nine-sixteenths inches long, the shorter axis being five and five-eighths inches in length and crossing the longer one where the sagittal and coronal sutures meet.

The frontal bone from the coronal suture to the nasal arch measures four and five-sixths inches.

The width of the inferior maxillary at the point of the chin is one and one-quarter inches, the thickness at the widest part of the above line being half an inch,

The femurs are one foot four and three-quarter inches long, the width just below the upper condyles being two and one half inches; the condyles on the upper ends are in fair condition but on the lower ends one on each is missing.

The tibias are one foot one and three-sixteenths inches long and one inch and

seven-eighths in width just below the upper condyles which are intact, but the lower ones have wasted away.

Fragments of the humerus, left ulna, scapula, and fibula and eleven other pieces, whose positions could not be definitely determined, were found; they are in various stages of decomposition, the only ones that are entire being the atlas and axis and the right and left astragali.

The skeleton was surrounded with small shell heaps and directly under it were a number of stones. The excavation made was six feet long, three feet wide and five feet deep.

No implements of any description were found but near the body were a number of pieces of charcoal and also a few flint flakings. When a warrior or a chief died the indians generally had a feast before the corpse was buried, and in this case they no doubt had both shell fish and venison, as fifteen deer bones were found with the skeleton, most of which had been cracked open to extract the marrow.

I subjected the cranium to my uncle, Major V. B. Hubbard, for inspection; he has been a surgeon in the United States Army for over thirty years and has made a special study of the indians during that time. He reported that it was, without doubt, an indian's, as indicated by the receding forehead and the prominent protruding malar bones and general conformation of the head. Another peculiarity he pointed out, and one that is characteristic, not only of the aboriginal tribes, but also of the indians of the present day, is the smooth surface of the molars, which he attributed to the half cooked food that constituted the greater part of their sustenance and which required an extra amount of mastication. He had known of indians in the west whose teeth were ground down half way to the gums but were otherwise in perfect condition, and the teeth in this specimen were no doubt solid, even though they were half gone.

Mr. Wm. T. Davis presented an old poster, donated by Mr. Wm. Olliff, which reads as follows:

A MEETING

of the

CITIZENS OF RICHMOND COUNTY

will be held at

NAUTILUS HALL,

TOMPKINSVILLE,

THIS EVENING,

Sept. 2d, at 7 1-2 o'clock,

For the purpose of making arrangements to celebrate the burning of the Shanties and Hospitals at the Quarantine ground last evening, and to transact such other business as may come before the meeting.

Sept. 2d, 1858.

Mr. Davis also read the following memorandum on

THE SNOWY EGRET.

A specimen of the Snowy Egret (*Ardea candidissima*, Gmelin), now a rare visitant on Staten Island, was seen on the 5th of last August feeding in a small pond between Richmond and Green Ridge. It took flight, but later, as I stood by another pond not far distant, the bird lit upon its border, though I was plainly in view. It circled about very gracefully before it finally got down to the level of the water. It was reported that two had been seen together on the Fresh Kills meadow, and that the past was the first summer for many years in which they had appeared in the neighborhood.

Mr. Arthur Hollick remarked that during the latter part of the Summer and early Autumn of 1872 a snowy egret made the vicinity of Clove Lake its abiding place. At that time the southern end of the lake was a dense swamp, in which the bird found a safe and quiet retreat.

RECENT LITERATURE RELATING TO STATEN ISLAND.

Mr. Hollick read the following memorandum:

In *The Microscope*, Vol. 2, No. 10, Oct. 1894, pp. 145, 146, under the title "A New Dictyosphaerium," may be found an illustrated account of the plant first described in our Proceedings for Jan. 13, 1894. The figure is by Mr. Georges Dupuy.

MINOR NOTES.

Mr. Walter C. Kerr exhibited specimens of catbrier berries, (*Smilax rotundifolia*, L.) specially prepared in order to show the peculiar strengthening bands or ribs which extend from base to apex. Attention was first called to these by Mr. L. P. Gratacap and a memorandum by him on the subject may be found in the Proceedings for December 17, 1892. Dr. N. L. Britton referred to a recent treatment of the subject in a paper on "The Smilacæ of North and Central America," by Dr. Thos. Morong, in the *Bulletin of the Torrey Botanical Club* for October, 1894.

Dr. Britton reported the coltsfoot (*Tussilago Farfara* L.) as growing along the Richmond Road near Garrettsons—an addition to the previously known flora of the Island.

The president then delivered his annual address, as follows:

ANNUAL ADDRESS OF THE PRESIDENT.

The most satisfactory feature to be observed in connection with the close of our thirteenth year is that it has not differed materially from the year which preceded it. Our meetings have continued to be well attended, the interest has been fully maintained, the contributions to the Proceedings have been more extended, while the membership has increased until it now numbers fifty-seven.

The principal contributions to the printed Proceedings are:

Rediscovery of *Anodonta Fluvialilis* on Staten Island; A recent find of drift fossils at Princes Bay; Mineralogical notes; Additional determinations of Schobarie fossils from the drift; Discovery of *Wolfia* on Staten Island; Staten Island harvest flies; A new *Dictyosphaerium*; Aerial roots on *Acer rubrum*; A recent discovery of fossil leaves at Arrochar; The seventeen-year locust on Staten Island; Additions to the drift fossils of Staten Island; Some observations on the behavior of a myxomycete; Finding of a mastodon's tooth; Notes on *Bryaxis abdominalis*; Notes on *Naias flexilis*; The barred owl on Staten Island; Seventeen-year locust pupæ; Staten Island crows and their

roosts; The New Dorp duelling ground and its victims; The seventeen-year locust on Staten Island in 1894; The growth of *Hypoxis erecta* after fire; Monmouth battle ground; Plant remains in limonite from the moraine at Clifton and their significance; Centennial of Richmond County's third court house; also numerous notes and references to literature relating to Staten Island, it having been determined wise and proper for this Association to index such literature by title and reference in its Proceedings.

The suggestion made in the last annual address that the Association publish a volume covering our natural resources, in which would be collected our various published lists revised to date, together with much additional matter now on hand has been quietly taking form among those interested and there seems no obstacle to its early production except possibly the expense attendant upon its publication in the style which such a volume would perhaps warrant. If not too much restricted in expenditure much interesting and useful matter could be included that must be excluded if the size must be limited for reasons of economy. We have the material for useful and attractive illustration of new or rare species providing we can see our way clear to undertake the expense of plates, some of which should be colored. It seems time for the Association to now definitely consider the execution of this project, which only awaits ways and means to become a reality.

It is satisfactory to note the progress made during the past year in our library, and especially the binding of about one hundred and twenty-five volumes, thus rendering our serial exchanges available for the use of members, this having been accomplished by private subscription.

If any one thing were to be selected as especially conducing to the interest in and general welfare of the Association, it is the importance of members contributing freely to the Proceedings. We should accumulate a fund of material in excess of publication which could be used to advantage in editing, that our monthly issue might be more uniform in size. It may be a fair criticism to remark that frequently members could contribute interesting notes were it not for the fact that they consider them too insignificant for publication. The habit of contributing a little now and then, even most informally, is a desirable one to cultivate and it is only in this way we can truly serve the purpose for which we meet and slowly accumulate records of the phenomena of nature, whose laws we admire and respect.

PROCEEDINGS

OF THE

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

VOL. IV. No. 12.

DEC. 8th, 1894.

Meeting held at the residence of Mr. Thos. Craig, Vine street, New Brighton. The president in the chair.

Messrs. Otto Ahlmann and H. F. Clark were elected active members.

Mr. Walter C. Kerr exhibited numerous maple leaves injured by storm and read the following:

SURVIVAL OF STORM-INJURED LEAVES

During the past summer it was frequently remarked that the late spring frosts had seriously injured the young foliage, several gentlemen having commented upon the damage thus wrought to their shade trees. My attention was first attracted, on May 27th, to the wilted appearance of the leaves of a white oak on Richmond terrace, near Stuyvesant place, and later to the similar condition of the Norway maples on DeKalb street. A search for parasitic fungi as the cause revealed nothing and it was not until a gardener suggested the wind that the true explanation appeared. This perhaps should have been more apparent, although few seem to have suspected the real cause. The damage was so general that it contributed a conspicuous feature to our summer's foliage throughout our eastern and southern exposures, as has already been incidentally mentioned in the Proceedings for October in connection with the effects upon the *Cicadas*.

The storm, which lasted several days, began on May 20th, and the trees then in foliage all suffered more or less, the extent of damage seeming to be proportional to the size of the leaves. The white oaks and the maples having the largest leaves at that season were lashed and bruised in a somewhat interesting if not remarkable manner. Fruit trees

were also considerably injured. Few, if any, leaves were killed. They seem rather to have been injured in spots, chiefly at the tips, though also along the edges and through the blades of the leaves, extending inward from the sinuses, withering at these points while the remainder of the surface was unharmed. Some were split radially along their weakest sections, withering on the edges of the split. In some over three-fourths of the surface was killed, the shape however being preserved intact, the other fourth remaining green and healthy. It is difficult to describe their appearance but the specimens submitted will indicate the peculiar way in which they were affected by the injury. The general appearance of the trees has been too common all summer to require special comment. Similar injuries are reported by Mr. William T. Davis and Mr. Charles W. Leng as observed, especially on the leaves of oaks and maples, at Newfound-land, N. J., where a high ridge furnishes opportunity for exposure.

With easterly storms so prevalent on our coast it is strange to find so conspicuous a result from a storm possessing no unusual characteristics, and the simplest explanation would obviously be that it occurred just at a time when many leaves were sufficiently young and tender to receive the injury, yet old enough to survive it—a combination that might not often occur.

Mr. Wm. T. Davis exhibited specimens of dragon flies and read the following:

TWO ADDITIONS TO THE LOCAL LIST OF DRAGON FLIES.

The dragon fly, *Libellula axillena* Westwood, form *vibrans*, was quite numerous

last August in various parts of the island, both near ponds and in woodland. If persistently disturbed they often flew into the highest trees. The first one was seen on August 4th in the valley of Reed's basket-willow swamp. In capturing it the abdomen was knocked off, and the remainder of the insect, true to what I afterward found to be the custom of the species, flew into a tree. Several missiles induced it to change this perch for a less elevated one, and it was finally placed in the cyanide bottle. Previous to the summer of 1894 this dragon-fly had not been seen on the island and it is an interesting fact that it eventually came in such numbers.

Two small specimens of *Diplax semicincta* Say, were taken on the 15th of last July at the small ponds of the old iron mines near Four Corners. This locality is also the only one on the island where *Nannothemis bella* Uhler, has been found.

With these two additions the species belonging to the sub-family *Libellulinae*, so far collected on the island, number twenty two. Mr. Calvert reports but twenty-four species from the vicinity of Philadelphia.

Mr. Ira K. Morris sent the following communication which was read by the secretary:

THE OLD MORAVIAN SPRING.

During the work of excavation of the new lake in the Moravian Cemetery, at New Dorp, it became necessary to destroy the historic spring which has long been known as a familiar relic of the revolutionary period.

The officials of the cemetery desired very much to preserve the spring; but its location—being not far from the centre of the lake—and its shallow depth of four feet, precluded all possibility of such work.

The spring was never known to run dry until the work on the excavation cut off the water veins leading to it. Then there seemed nothing left to do but to pull down its stone wall and lower it to the uniform grade of the lake.

The simple history of this old spring can be told in a few words. Two or three

weeks after the arrival of the British army at New Dorp, in 1776—numbering between 25,000 and 30,000 men—a serious water famine threatened the vicinity.

Through the recommendation of General Cleveland, the Chief Engineer of the British army, Sir William Howe issued an order protecting all the wells and springs for miles around. There were several large springs at and near New Dorp at that period which have long since ceased to exist. They were made deeper and were walled up with stones by the British soldiers. This was considered the largest one in the vicinity.

The old Moravian Spring was given especial care, because it was located in close proximity to army headquarters, and helped to form one of the most beautiful little nooks on Staten Island.

MINOR NOTES.

Mr. Arthur Hollick reported that an opossum was captured on Dec. 6th, at New Dorp, by Mr. Richard Britton. It was found in a shallow burrow in the ground, near the foundation walls of an old ruined house, and was easily unearthed. The animal was killed and has been sent to a taxidermist for mounting. From the appearance of the locality Mr. Britton is of the opinion that a colony of the animals is living there.

A pair of heavy brass rimmed spectacles, contributed by Mr. F. E. Baldwin, was shown, which was found in an old cellar at Port Richmond. One glass and part of the of the metal work is missing, but enough remains to indicate that it was of home manufacture and of considerable antiquity.

Mr. Wm. T. Davis exhibited a small indian stone paint pot, recently found at Tottenville. This is the first utensil of the kind reported from any of the collections made on the island.

Mr. Davis also exhibited a large Yellow Gravel pebble, consisting of a mass of silicified coral, (probably an *Eridophylum*) found by Mr. Trigg on the shore at Eltingville.

The president designated Mr. Arthur Hollick to edit the current issue of the Proceedings.

PROCEEDINGS
OF THE
NATURAL SCIENCE ASSOCIATION
OF STATEN ISLAND.

VOL. IV. NO. 13.

JAN. 12th, 1895.

Meeting held at the residence of Mr. F. H. Bergen, St. Mark's Place, New Brighton. The president in the chair.

Messrs. Chas. J. Stevens, Stapleton, and P. B. Cook, New Brighton, were elected active members.

Mr. Ira K. Morris read a paper upon "Staten Island's First Bank—1838," which will be issued as a special number of the Proceedings.

Mr. Wm. T. Davis read a preliminary paper upon Staten Island local names for places (villages, roads, hills, creeks, &c.) and promised a completed contribution for publication on the subject at some time in the future.

Messrs. Walter C. Kerr and Fred. F. Hunt contributed the following upon the black sand previously exhibited by Mr. Kerr.

IMITATION "IRON SAND"—PYRRHOTITE.

In the Proceedings for April 14th, 1894, (Vol. IV., p. 21.) mention is made of sand, colored by a black substance, having a strong sulphurous odor, found in depressions in the salt meadows near Giffords, and attention was called to the fact that it was common beach sand from which the black coating was readily dissolved by acids.

More accurately, it was found on the sandy bottoms of salt pools in the peaty beach, rather than salt meadows, forming deposits several inches in thickness and small in area, rarely exceeding three or four square feet and seldom covering the entire bottom of the pool.

These pools, though not stagnant, contain decaying sea weeds, also disintegrating mussels, conchs and other mollusks, evolving sulphuretted hydrogen in suffi-

cient quantity to be noted by the odor and to support the alga (*Beggiatoa* sp?) which grows only where that gas is liberated.

The sea water contains iron salts, probably in considerable quantity in a harbor subject to such contaminating influences as exist in this locality, while the soil of the region near Giffords is rich in iron from the drift material, limonite, etc. The iron would readily become soluble as a ferrous carbonate by the action of carbonated water, such as rain, or by reduction to soluble salts through the action of humus from decaying vegetable matter.

The presence of iron in solution subject to the action of sulphuretted hydrogen readily accounts for the precipitate of ferrous sulphide FeS which is the composition of the coating on this sand as shown by analysis made by Mr. Fred F. Hunt.

Frequently one of the areas of deposit will have a conch, decaying within its shell, as a center, and the edges of the area always seem quite sharply defined. This precipitate gathers uniformly around the grains of sand, coating them densely black so that to the naked eye and under the microscope they closely imitate the ordinary black sand formed by the pulverization of magnetic iron ore. A simple test with acids or a magnet will easily distinguish the difference.

The exact composition has not been determined, but the analysis is quite sufficient to refer this ferrous sulphide to the species Pyrrhotite, which in composition varies from Fe_5S_6 up to $\text{Fe}_{16}\text{S}_{17}$, and which has not heretofore been reported as occurring on our island.

Perhaps the most interesting feature of this occurrence lies in the fact that the mineral is in process of formation and thus

we are enabled to observe the causes which bring it into existence as well as the result.

Mr. Arthur Hollick exhibited specimens of dried plants and read the following memoranda :

ADDITIONS TO THE LOCAL FLORA.

The last general enumerations of recent additions to our local flora were made by Mr. Wm. T. Davis, which may be found in our Proceedings for April 8th and Oct. 14th, 1893.

In the following list there is gathered together all others which have been noted at different times recently and some which have not been previously called to the attention of the Association.

Leucodon julaceus Sulliv. Richmond. Mrs. N. L. Britton.

Salvinia natans (L.) All. Silver Lake and Ocean Terrace. Thos. Craig, (Proc. Oct. 14th, 1893.)

Osmunda cinnamomea L. var. *frondosa* Gr., Pleasant Plains. This variety is described as having the frond fertile above and sterile below, while ours is *vice versa*. This same variety was also found at Garrettsons some years ago and was noted in Bull. Torr. Bot. Club, ix. (1882) 129.

Wolffia Columbiiana Karst. Old Town Pond. Thos. Craig, (Proc. Dec. 9th, 1893.)

Quercus Brittoni Davis. Watchogue. Wm. T. Davis, (Proc. Sept. 10th, 1892.)

Alnus incana (L.) Willd. Grant City. Dr. N. L. Britton.

Gerardia purpurea L. var. *paupercula* Gray. New Dorp. Dr. N. L. Britton.

Veronica Anagallis-aquatica L. New Brighton. Dr. F. Hollick. This is the same species which was described by Dr. Britton under the name *V. Anagallis* L. var. *latifolia* Britton, in Bull. Torr. Bot.

Club, xii, (1885) 49, from Mahwah, N. J. Since then it has been found in other places and now turns up on Staten Island.

Convolvulus sepium L. var. *repens* (L.) Gray. Oakwood.

Fraxinus viridis Michx. f. Vanderbilt Av. and Richmond Rd. Tysen's Lane, New Dorp. Dr. N. L. Britton. (Proc. Oct. 15th, 1892.)

Centaurea nigra L. Moravian Cemetery.

Solidago Elliotii T. and G. Garrettsons. Dr. N. L. Britton.

Tussilago Farfara L. Garrettsons. Dr. N. L. Britton. (Proc. Nov. 10th, 1894.)

Gnaphalium purpureum L. Egbertville. Dr. N. L. Britton. This species was admitted into the original catalogue on the authority of a specimen in the Elliot herbarium, but this is the first specimen which has been collected by any member of the Association.

Valeriana officinalis L. Gifford's Lane. This name must replace *V. sylvatica* Banks. in the original catalogue, which was erroneously determined.

Agrimonia mollis (T. and G.) Britton, and *Agrimonia striata* Michx. replace *A. Eupatoria* L. in the original catalogue, which does not occur here. (Proc. Sept. 9th, 1893.)

Barbarea praecox (Wild.) R. Br. Pleasant Plains. (Proc. June 9th 1894.)

Barbarea stricta Andr. Pleasant Plains. (Proc. June 9th, 1894.)

MISCELLANEOUS MATERIAL EXHIBITED.

Mr. E. Lyman Low exhibited a silver half dime, date 1792 or '99, found near the site of the old Raynor house on the Snug Harbor grounds.

The president designated Mr. Ira K. Morris to edit the current issue of the Proceedings.

PROCEEDINGS

OF THE

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

VOL. IV. No. 13.

(SPECIAL No. 19)

JAN. 12th, 1895.

STATEN ISLAND'S FIRST BANK—1838.

BY IRA K. MORRIS.

One of the brightest periods in the history of Staten Island was that which began with the year 1835, and extended to the memorable financial panic of 1839. Various enterprises requiring capital and perseverance were undertaken, and called business men and capitalists into action.

State banks were springing up all over the country, and there has been no question that ever created more bitter discord among the people than that of legalizing those mushroom institutions. The National Congress and the various State Legislatures were deluged with petitions from the friends and enemies of the measure. Every reader of history, however, is too familiar with the manner in which it was finally settled to need repeating in detail at this time.

The Staten Island Bank began business about September, 1838, and was located in the two-story frame structure still standing at the junction of Richmond Terrace and Broadway, Port Richmond. It is now occupied as a barber's establishment.

The first Board of Directors were Richard D. Littell, John H. Smith, William A. Swain, Franklin S. Kinney, William Woram, William Colgate, Eder V. Houghwout, Jacob Bodine, John Totten, Sen., Joseph Seguine, John T. Harrison and Samuel Sherwood. Richard D. Littell was president and John West cashier.

On the 20th of January, 1838, the following article appeared under the caption of "Public Meeting at Factoryville,"

in the *Richmond County Mirror*:

"NOTICE.—A meeting of the citizens of Richmond County, without distinction of party, opposed to all monopolies, will be held at the Shakespeare Hotel in Factoryville, [the old Fountain House, West New Brighton] on Thursday, the 11th inst., at 6 p. m., to take into consideration the best method of paralyzing the efforts about to be made by certain individuals to procure charters for a bank, a whaling company and a steamboat ferry company."

Agreeably to the above notice, a large and highly respectable meeting was convened, when the Hon. Samuel Barton was appointed chairman, and Paul Mercereau, Jr., appointed secretary, and the following preamble and resolutions were read for the consideration of the meeting, and disposed of in the following manner, viz.:

Whereas, Notice has been given that application will be made to the Legislature of this State, at its present session, for acts to incorporate a Bank, a Whaling Company and a Ferry Company, therefore,

Resolved, that we view the application for a Bank at the present time as a most flagrant and daring insult to the good sense of the People, and underrating the good judgment of our Legislature, past experience having proved that our banking system is not sufficient to issue a sound and healthy currency, and that we will use all honorable means to bring into contempt our present odious banking system. Unanimously adopted.

Resolved, That we, through our limited understanding, cannot perceive the necessity of an act of incorporation to capture whales or to manufacture oil and

candles, because we have no statutes which prohibit the free access thereto; but deem the only advantage to be derived from such an act is the screening the private property of the stockholders from the fulfillment of their corporate obligations if unsuccessful. Rejected by a majority.

Resolved, That we view the application for an act to incorporate a Steamboat Company entirely unnecessary. Unanimously adopted.

Resolved, That we view all acts of incorporation for special purposes as coming from the People, and that we the People have a just claim to make enquiries into the necessity of such acts of incorporation, and if found wanting in the balance of justice, to instruct our representatives to veto the applications in the bud, and thereby save ourselves a vast amount of money which is expended in payment of Legislatures for discussing topics which of right they have no business to meddle with. Unanimously adopted.

Here a gentleman arose and requested to have the last resolution amended before publishing.

Resolved, That we look upon the prosperous and happy condition of the citizens of this county with pleasure, and attribute the same to the absence of chartered institutions. Unanimously adopted, and, on motion, being reconsidered, it was ordered to be stricken out.

Resolved, That we will use all honorable means to prevent the passage of laws authorizing acts of incorporation for special purposes. Unanimously adopted.

Resolved, That the following remonstrance be presented to the meeting for subscribers, which was read as follows:

To the Honorable the Legislature of the State of New York:

Whereas, Notice has been given in the *Richmond County Mirror* that application will be made to your honorable body at its present session, for the passage of an act to incorporate "the Richmond County Bank," to be located on Staten Island; also, for an act to incorporate an association for the purpose of carrying on the Whaling business, and the manufacture of Oil and Candles, to be located at Mersereau's Ferry [Port Richmond] in the County of Richmond; also, for an act to incorporate an association for running a steamboat between New York and the north side of Staten Island.

Your petitioners therefore humbly represent to your honorable body that in their opinion it is inexpedient and unjust to grant said acts of incorporation; that

it is also their opinion that your honorable body should grant no exclusive privileges for any purposes whatever, unless the object to be obtained is beyond the reach of individual enterprise, or of an association of individuals in the form of a co-partnership, and of vital importance to the well being of the whole community. That a whaling company or a steamboat company are neither of them of this character, must be obvious to the meanest capacity. With respect to the bank there is such a diversity of opinions as to the best method of preserving a sound paper currency, and so many objections to our present system of banking, that it is confidently expected that your honorable body will refuse to extend it, until you have fully considered the subject, and are satisfied that a better and more equitable system cannot be adopted. Your petitioners think it preposterous in any government to lend its aid to carry into effect the mad schemes of speculators, to permit them by the aid of their corporate privileges to appropriate all the profits arising therefrom to their private use, as long as successful, by which they often acquire princely fortunes, and then by their private property being exempt from the payment of their corporate debts, enable them when unsuccessful, to throw the burthen of their losses on the community. It is no longer a novelty to see the individual stockholders of a bankrupt institution living in splendor and rolling in wealth, while from the poor mechanic and laborer they withhold the amounts justly due to them, and thereby deprive them of all means of supporting their destitute and unhappy families. It is also a bitter reflection that such cruelty and injustice is sanctioned by the laws of our beloved country, from which there is no earthly appeal. Entertaining the highest opinion of the intelligence and patriotism of your honorable body, they willingly submit the result to your final opinion.

Here a gentleman arose and stated that the abstract principles of the foregoing remonstrance were undoubtedly correct, and entirely in accordance with his view of the whole subject, except that part which refers to the whaling company. It was therefore rejected by a majority.

Resolved, That the following persons be appointed a committee to solicit subscribers to the above remonstrance, viz.: John C. Thompson, Tunis Egbert, Daniel Garrison, R. O. Joralemon, James G. Brittain, Charles Van Name, Michael Van Name, Richard Christopher, Samuel

Barton, Jacob Simonson, Joseph Egbert, Jacob B. Mersereau, D. V. N. Mersereau, Israel D. Johnson, Michael Tynan, Minthorne Tompkins. Rejected by a majority,

Resolved, that the proceedings be signed by the chairman and secretary and published in the *Richmond County Mirror*. SAMUEL BARTON, Ch'm.

PAUL MERSEREAU, Jr., Sec'y.

On February 17th, 1838, the *Mirror* stated that "on Tuesday, Mr. Oakley, in the Assembly, presented two several petitions: one to incorporate "the Staten Island Whaling and Manufacturing Company;" the other, to incorporate a literary institution to be called the University of the United States, to be located on the highlands of Staten Island. Also a remonstrance of the citizens of Richmond County against the proposed banking and whaling companies, and incorporations generally.

August 11th, 1838, the *Mirror* stated that "the Richmond County Bank is soon to commence business."

November 3d, same year, the same paper said, editorially:

"Staten Island Bank—This institution—so interesting to those whose friendly feelings are enlisted with our little country—is now on the full tide of successful experiment. Although it has not been so long in embryo as some of its sister institutions, it has been the *very first* in the State to issue notes! We have now barely room to say that the notes are beautiful specimens of art, and reflect credit both upon the artists who have executed them and the company whose enterprise furnished the design. Each bill bears the signature of the Register at Albany, and the vignette of the State, with the comprehensive sentence, viz: 'Secured by State Stocks and Real Estate—Registered and Countersigned in the Comptroller's office of the State of New York.' It would be superfluous for us to express any hopes for the credit of an institution with such a basis."

It will be noticed that there seems to be a close connection between the Bank, the Whaling Company and the North Shore Ferry. That is accounted for by the fact that almost the same company of capitalists were managing all three enterprises.

The last, however, that we have been able to discover in print relative to the

Bank, was in the *Mirror* of December 1st, 1838, as follows:

"The Staten Island Bank has disappointed many of its opponents by merely going into operation. It was the first to issue notes under the new banking law, and it seems to be fast recovering from the imbecility of infancy and vigorously taking its stand among its kindred institutions."

It will be remembered that with the year 1832 there began in this country an era of speculation, which was in reality the prime cause of the great financial panic which came a few years later. It began by the establishment of National banks, which were demolished by President Jackson, and from the smoldering ruins of that National system sprang an even weaker one—the State banks,

Like those which had been fostered by the National Congress, the State Banks started off with the brightest prospects, only to meet with a similar fate. Confidence in them gradually and surely became extinct. The local press never fought a harder battle than in its efforts to rally the people to the support of the State Banks, in the respective communities in which they were located. But one by one they closed their doors, and stockholders and depositors generally became sadder and wiser men.

It was about the year 1841 that the Staten Island Bank ceased to exist. Financial failures were daily occurrences all over the country, and Staten Island depositors, becoming alarmed, withdrew their money from the institution in such a determined manner, that one morning people passing along the Shore road saw a piece of paper tacked on the front door, bearing these words: "This Bank is permanently closed. Richard D. Littell, president."

So few depositors were there left at the time of the suspension that the occurrence caused scarcely a ripple among the business men of Staten Island. The last depositor who was fortunate enough to withdraw his money was the late James Bennett, of Elm Park.

In this day of rush and speculation in which we live, it seems to the writer quite

appropriate to repeat a remark made by one of the depositors of this defunct bank: "I liked the President of that bank," he said; "I knew him personally, and I believe there never lived a more honest man. But, you see, he would trade horses, and I think that affected the confidence of the public."

P. S,—Since writing the above, I have been shown a two dollars bill issued by the old Staten Island Bank, and dated June 21st, 1841. It belongs to Mr. Chas. H. Ingalls, president of the First National Bank of Staten Island. It came into his possession in a peculiar manner. An

old lady, a resident of Staten Island, heard that the bank with which Mr. Ingalls is connected had commenced operations, and she wrote to him to ask if he proposed to redeem the notes of the old bank, as she had saved this one for many years hoping to get her money back. Mr. Ingalls wrote her that it was not the intention of the company to redeem the notes of the old bank; but it would gladly buy this one at its face value, and he therefore gave her two dollars for the relic. Mr. Ingalls has kindly loaned me the note for inspection by the members of the association.

I. K. M.

PROCEEDINGS

OF THE

NATURAL SCIENCE ASSOCIATION OF STATEN ISLAND.

VOL. IV. No. 14.

FEB. 9th, 1895.

Meeting held at the residence of Mr. F. W. Skinner, Sherman avenue, New Brighton. In the absence of the president Mr. A. K. Johnston was elected chairman *pro tem*

Mr. Arthur Hollick read the following paper upon

OUR WATER SUPPLY.

The recent inconvenience to which so many of us have been subjected during the past few days, by reason of failure in our public water supply, has decided me to present a few facts in this connection, somewhat in advance of a more extended article which I have in preparation.

I notice in to-day's local papers a communication from the superintendent of the Staten Island Water Supply Company in which the lack of water is ascribed to the waste occasioned by consumers allowing it to run in order to prevent the freezing of pipes. The statement is also made that the amount now supplied is 150 gallons per capita daily.

In the summer of 1890 the supply ran short and the president of the company prepared a somewhat lengthy statement, which was published in the local press, hinting that waste from garden hose, etc., was responsible. At that time also the claim was made that this community was using 150 gallons per capita daily. In the winter of 1893, and also during other more limited periods, the supply has failed, presumably by reason of similar conditions. If these statements are correct we are about as extravagant a community in the matter of water as any in regard to which I have any record, and unless the figures of the Water Co. are at fault we should certainly mend our ways. New York City, in its most extravagant times, man-

ages with about 120 gallons per capita daily, and for all reasonable purposes we ought to be content with less than that.

As to the *quality* of the water, we are now in possession of a sufficient number of facts to draw very positive conclusions. In the first place I take it for granted that we all know that this water is Staten Island water, and that it is only such as originally fell in the form of rain upon the water shed from which it is pumped. This latter assertion may perhaps be qualified so far as that portion of the area near tide water is concerned, where the seepage from the salt water would probably have to be taken into account. This water shed is about five square miles in extent. It begins at Bodine's Mill on the boundary line between New Brighton and Port Richmond; it includes Silver Lake and its tributaries in the Clove Valley on the east; the northern slope of Ocean Terrace from the junction of the Little Clove road to the Manor Road on the south; thence the boundary is an irregular line to Bull's Head, along the trap ridge north-west of the Morning Star road nearly to its junction with Richmond avenue, and from thence irregularly to Bodine's Mill again. It may thus be seen that this water shed is in the form of a loop, broad at the south, where it reaches an elevation in places of more than 300 feet, and constricted to a narrow outlet in its lowest part at Bodine's Mill. Manifestly the conditions are such that all the surface and subsoil water would eventually find its way to this outlet. Now we all know that the lower portion of this water shed is quite thickly populated and that more or less soil pollution is in-

evitable from cesspools and household refuse of all kinds, besides which there are five cemeteries in the upper portion where the population is more sparse. We should therefor be justified in inferring that any water drawn from near the outlet would show the effects of such conditions, more than water drawn from the higher parts. In a popular article on the subject, published in the *Staten Island Magazine*, (Vol. i., No. 1, Aug., 1888, and also reprinted in the *Staten Island Post*, Aug. 11th, 1888, and the *Staten Islander*, Feb. 13th, 1889), I called attention to these facts and predicted that the water supply would show evidence of deterioration within a comparatively short time.

There are now two pumping stations located in the area in question. The

Staten Island Water Supply Co., which supplies New Brighton and Port Richmond, is in the lowest part, at tide level, near Bodine's Mill; the Crystal Water Co., which supplies Edgewater, is in the upper part, near the Little Clove Road, at an elevation of about 150 ft. I have been able to obtain records of analyses of the water from each of these pumping stations, extending from 1883 to 1893 for the former, and from 1885 to 1894 for the latter. A comparison of these is exceedingly instructive and shows how exactly the predictions have been verified. In the limits of this paper it would not be possible to include all the analyses now in my possession, so I shall merely compare the earliest and latest in each case, viz.:

CRYSTAL WATER CO.

S. I. WATER SUPPLY CO.

Oct. 22, 1885	Nov. 1894.	PARTS BY WEIGHT IN 100,000 OF	June 30, 1883	Oct., 1893.
1.006	0.935	.....Chlorine in Chlorides.....	0.879	1.305
1.642	1.541	.....Equivalent to Sodium Chloride.....	1.448	2.150
Faint trace	None	.....Phosphates.....	Faint trace	Faint trace
None.	None	.....Nitrites.....	None	Trace
0.0329	0.0411	.....Nitrogen in Nitrates and Nitrites.....	0.0823	0.224
Trace.	Trace.	.....Free Ammonia.....	None	0.028
0.01	0.003	.....Albuminoid Ammonia.....	0.0014	0.0118
		Hardness—Equiv. to Carb Lime.		
6.00	5.50	.....Before boiling.....	6.727	9.50
5.00	5.00	.....After boiling.....	3.967	2.00
4.75	3.00	.....Organic and Volatile (loss or ignition).....	Trace	6.50
7.75	7.10	.....Mineral Matter (non volatile).....	13.00	5.50
12.50	10.10	.....Total solids (by evaporation).....	13.00	16.00

If these results are considered it will be at once seen that whereas the water from the wells of the Crystal Water Company, located in the upper portion of the water shed, has suffered no deterioration in quality, in fact has even improved, that from the wells of the Staten Island Water Supply Company, located in the lower portion, has deteriorated very sensibly and gives cause for just apprehension as to its future. Chlorine has risen from 0.8 to 1.3; nitrites from "none" to "trace"; free ammonia from "none" to 0.02; albuminoid ammonia from 0.001 to 0.01; organic and volatile from "trace" to 6.5. The hardness has also increased while the mineral matter has decreased.

The increase in chlorine may be due either to salt water or to sewage contamination*. The nitrates are beginning to approach a suspicious limit, and the

presence of nitrites in perceptible quantity does not look well. The ammonias also are high, while the great increase in organic and volatile matter from "Trace" to 6.5 gives cause for serious thought and should lead to careful investigation.

It should also be borne in mind that any apprehension which may be felt, by those who are conversant with the facts, is not so much on account of the actual *amount* of the suspicious constituents in the water at the present time as it is on

* *Mem.*—Considered by itself the presence of chlorine is not necessarily indicative of dangerous contamination. It is by no means uncommon in perfectly potable water. Rain water, especially in a region like ours, near the sea coast, may contain an appreciable amount of this element (see article on Chlorides in Our Rainfall, L. P. Gratacap, Proc. Mch. 14th, 1885). When it occurs in constantly increasing amount in any locality, however, especially when associated with other suspicious circumstances, we may fairly class it with other indications of contamination.

account of their *steady increase*, and the manner in which previous predictions, founded upon careful study of the conditions, is being verified. As a rule, so long as the water is clear in its appearance and without odor, the average person does not concern himself to inquire any further, but it cannot be too often reiterated that mere appearance is of but little value as a standard of purity. Thus in the Winter of 1891 there was considerable alarm on account of the muddy or turbid appearance of the water in the pipes, but an analysis by one of our members (L. P. Gratacap, see Proc. Feb. 14th, 1891) showed that this was merely a mechanical inorganic sediment, probably due to the introduction of some mud during repairs.

The subject, however, is not without its humors, and the manner in which it has been at times discussed by our public servants, in their attempts to understand some of the details, as well as by many of our well meaning citizens, has been ludicrous in the extreme. This paper is

not the place to record such incidents, but it may be readily imagined how chemical symbols in a water analysis would sound, in an attempt to pronounce them phonetically, as was gravely done, without a smile, at a meeting of one of our public boards, when Na Cl was called "Nakle," and Ca Co₃ was transformed into "Kakothree." I would also like to call attention, without comment, to an analysis of the Crystal Water Co.'s water, alleged to have been made about Aug. 31st, 1891, published in the *Staten Islander*, Sept. 12, 1891, and to compare it with the regular weekly analysis of the Croton water made for the New York City Board of Health, Aug. 28th, 1891, and published in their weekly report of that date. The coincidence is amusing, to say the least, besides the minor errors which serve to emphasize the exposure. [A comparison of the two, in parallel columns, was here shown]

The chairman designated Mr. Arthur Hollick to edit the current issue of the Proceedings.

PROCEEDINGS

OF THE

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

VOL. IV. NO. 15.

MARCH 9th, 1895.

Meeting held at the residence of Mr. Fred. F. Hunt, St. Mark's place, New Brighton. The president in the chair.

The secretary reported the following new exchanges effected since the previous meeting: Nova Scotian Institute of Science; Vassar Brothers' Institute; Linnæan Society of New York; State Zoölogist of Minnesota and Free Library of the Public Schools of Huntington, Ind.

On motion the secretary was instructed to print the complete list of active members and organizers of the Association as part of the current Proceedings.

Mr. Ira K. Morris reported, on behalf of the Benham Monument Committee, that a bill had been prepared by congressman Franklin Bartlett, carrying with it an appropriation of \$10,000, for the erection of a suitable monument to commander Benham, in accordance with the plans of the Association, (See Proc. May 13th, 1893) which was introduced in the House of Representatives; but owing to the lateness of the term failed to receive proper attention. It will be introduced again at the next session of Congress.

On motion the secretary was instructed to transmit the thanks of the Association to congressman Bartlett, for his interest and activity in the matter. Mr. Morris also called attention to the following preamble and resolution recently adopted by the Board of Supervisors of the county:

WHEREAS, The Natural Science Association has undertaken the patriotic duty of securing a monument to mark the grave and honor the memory of the late Commander Timothy Green Benham, of the United States Navy, who was long an esteemed resident and useful citizen of this county; therefore

Resolved, That we, the Board of Supervisors of

Richmond County, recognizing the importance of this laudable undertaking, cherishing the memory of a hero whose service to his country in time of peace and war have added honor and lustre to the American Navy, and glory and importance to the flag under which he so faithfully served, do hereby most heartily indorse the action of the Natural Science Association at this time, and pledge our earnest support and co-operation for the accomplishment of so worthy a cause.

Supervisor Doyle spoke very earnestly in support of the patriotic movement, claiming that it was the duty of the Supervisors to give it their hearty endorsement.

Supervisor Feeny also favored the resolution, and offered an amendment to the effect that the Senators and Congressmen from the State of New York should be requested to give the matter their united support in securing an appropriation from Congress.

The resolution, together with the amendment, were unanimously adopted.

The following persons were elected active members: Cornelius G. Kolff, West New Brighton, and George M. Whitehouse, New Brighton.

Mr. Fred. F. Hunt read the following paper, illustrated by samples of the articles mentioned and tubes containing the tests made:

ARSENIC IN WALL PAPERS AND HANGINGS

Having had occasion lately to test some wall papers and hangings for arsenic, it may interest our members to know of the results obtained.

These tests were made on account of sickness, apparently a case of poisoning, which could not be traced to any cause. On finding that all the rooms in the house, except one, had arsenical wall paper, and also that some

curtains and furniture covering carried arsenic, the doctor attributed the illness to that cause, and this view seems to have been borne out by the recovery of the patients on the removal of the arsenical materials.

The house is an old one, on this island, and some of the rooms had four papers on the walls. For testing, the papers were taken off to the plaster and one test made of all the papers that were in one room together, so I am unable to say which carried the arsenic. The test used was the "Marsh test." All the rooms in the house that were papered, except one, and also the hallways, carried arsenic in larger or smaller quantities, some tests requiring the gas to be passed for ten minutes before showing the arsenic mirror, while others showed it after a few seconds and one test gave the largest amount I have found in any wall paper.

It is generally supposed that a paper must have green in it to carry arsenic, but that is not so, as I have found it in nearly all colors, one ceiling paper which has a ground of very light yellow with a gilt pattern on it carried notable quantities of arsenic, while other papers that were different shades of green, carried none; in fact my experience has been that the browns, reds, yellows and greys are the most likely colors to carry arsenic.

The cartridge papers do not carry arsenic as far as my experience goes, even if there is a pattern printed on them, this may be due to its being a comparatively modern wall paper, and the manufacturers having found that of late years there has been more or less agitation on the subject of arsenic in wall papers, are more careful of the pigments they use.

A set of red-brown colored chenille curtains in this same house gave a very marked mirror of arsenic although they had been in use for some time in another house; a jute-velour furniture covering, color old rose, also gave the arsenical mirror, and a crêtonne of a black ground with light colored figures and pattern was highly charged with arsenic, even

after several years use as curtains, indicating that use does not eliminate the arsenic. Tests were made of 60 pieces of lately imported English crêtonnes, and only 20 pieces were found to be free of arsenic. In Germany and, of late years in France, there are laboratories supported by the government, where anyone may take a substance believed to be injurious to health, to be tested free of charge, and, as there is a punishment for selling any such substance, fabrics from these countries are very likely to be free from deleterious matter.

There are two ways in which the arsenic may be disseminated in the air, first, by a chemical action forming arseniuretted hydrogen, which readily comes through any paper that may cover the arsenical one, and is breathed with the air; second, a purely mechanical action, where the arsenical paper is outside, by the pigment or sizing, drying and being carried off as a powder and breathed—both these actions may be taking place with an arsenical outside paper.

As the custom on this island has been very largely to put on a new paper over the old one, there are many houses having several papers on one room, (one instance, of which I am informed, where there were fourteen papers) and as the practice of using arsenic in the printing of wall papers was quite general some years ago it is very likely that one or more of these old papers is arsenical.

To these papers and to some upholstery stuffs may possibly be traced some illnesses whose cause has not been apparent.

Mr. Walter C. Kerr gave an outline of private discussions which had been held, during the past year or more, upon the effects of wind and rain upon foilage, and submitted the following :

NOTES ON THE DESTRUCTIVENESS OF WIND AND RAIN STORMS.

In the Proceedings for Sept. 9th, 1893, data were submitted tending to show the relative capacity for destruction of vegetation possessed by wet and dry storms,

especially as illustrated by our severe gales of Aug. 24th and 29th, 1893. Since the above mentioned paper was written the subject has been frequently in mind and new considerations have arisen which, though not final, throw additional light upon the phenomena.

In the previous paper it was argued that the augmentation of force caused by the water borne by the winds was chiefly accountable for the greater destructiveness of the wet storm with a high wind velocity than attended the dry storm having a much higher velocity. Reference was also made to the burden to vegetation by the added weight of water and to the matting together of the leaves, thus offering greater area and resistance to the wind.

There seem to be good reasons for considering other causes quite as active as the effect attributed to the rain. The degree of effect chargeable to the water is difficult to determine and under normal conditions of rain-fall would be much less than was assumed when the previous deductions were made. The effect of the matting of the wet leaves may be safely given greater importance as the resistance is no doubt much increased thereby.

The most important new consideration is the variability of the wind, concerning which our knowledge is much increased through the researches of Prof. S. P. Langley in his investigation of the phenomena underlying aerial navigation. (See Prof. Langley's article on "The Internal Work of the Wind," *American Journal of Science*, Jan. 1894). With delicate apparatus it was found that a wind of 23 miles per hour rose in 10 seconds to 33 miles and again within 10 seconds fell to its former velocity. Then within 30 seconds it rose to 36 miles, continuing to rise and fall through a range of speeds with an interval of about 10 seconds between the extremes. Sometimes the velocity even fell to zero.

This was not confined to a single instance but is shown to be true of winds in general. Such irregularity causes velocities determined by ordinary anemometers and the method of recording same to

be of little value for the purpose now under consideration, as such records yield but crude representation of the wind variations. Every one is familiar with the sudden fierce blasts which accompany most storms but they would appear from the above to be more characteristic wind features than has usually been allowed.

Such blasts may be heavier in a moderately high gale varying through a wide range than in a very high gale having less range, with a corresponding effect upon foilage, especially if the latter is wet and matted. Prof. Langley's experiments however, seem to show that the amplitude of variations is about proportional to mean velocities, the minimum approximating zero and the maximum approximating double the mean. One would therefore naturally conclude that the heavy wind contains the heaviest blasts, but the writer, from experience with the effect of wind upon sails of yachts, is not prepared to fully accept this.

This variability of velocity suggests the uneven rate of rain fall which is frequently evident in heavy storms, the water sometimes pouring down in veritable sheets. The coincidence of sudden increase in wind velocity and great increase in rain fall would be responsible for damage much in excess of expectations based upon anemometer records of intensity.

It is hardly too much to presume that when a strong wind is sweeping the water along nearly horizontally in a stratum near the earth the current is not only fed by drops from above this stratum, but deflected up-rushing currents from below may carry water or at least prevent its descent from the upper current and thus the volume of water is massed until intercepted by vertical obstacles. The occasional dashing of sheets of water against window panes with exceptional violence may follow this cause.

Trees develop the strength, root-hold and shape necessary to resist the normal elements of their locality and when they suffer exceptional destruction the presence of an abnormal force may be assumed. In this respect they differ widely from artifi,

cial structures, buildings, etc., whose strength is no factor of a struggle for existence. Thus only in natural living objects can we find a general measure of the influences whose exact laws are discoverable only through instruments of precision.

It is not easy to distinguish the relative values of wind and water when both are liable to wide momentary variation, while our common data are practically based on averages and taken by instruments whose veracity is in doubt. In this connection it may be pertinent to refer to the recent experiments conducted upon the Eiffel Tower by M. Koechlin where the force of the wind was measured with metal blocks whose resistance to overturning had previously been tested with compressed air.

On Nov. 12th, 1894, the anemometers registered 100 miles, which velocity reduced to pressure by the usual formula showed that a block resisting 200 kilograms should have been overturned. One hundred kilogram blocks were however the largest displaced. With proper allowances the experiments showed the formula or anemometer to be about 40 per cent. high.

Mr. W. H. Dines under less favorable conditions previously obtained similar results and has found the usual theory of anemometer cups moving with one-third the velocity of the wind gave results about 30 per cent. high. (See *Nature* Vol. 51, p. 181).

Mr. R. A. Parke has investigated the problem of determining the percentage of water in the air under uniform conditions of heavy rains and his deductions given in this number of the *Proceedings* indicate that the percentages assumed for illustration in the former articles are untenable.

If however we thus are led to lightly regard the presence of water in the wind and if the periodic feature of velocity is questioned, and if our standard anemometers are believed, we find we are still confronted with the records of Aug. 24th and 29th, 1893, when a 37 mile storm with a maximum of 48 miles, which velo-

cities are duplicated about once each month, destroyed more foilage than any storm on record in this locality, while six hours later a 35 mile gale with a 42 mile maximum did no damage and four days later a 54 mile storm with a maximum of 60 miles did little damage. The first had a heavy rain fall, the second none and the last but little.

Even if in general the amplitude of variations is proportioned to mean velocities, as determined by Prof. Langle, a simple explanation of the phenomena of Aug. 24 and 29, 1893, would be that these storms departed widely from the general law and the higher momentary velocities occurred in the milder gale.

In the light of this additional matter it may be well to reconstruct the deductions as follows and then consider them comparatively imperfect.

Severe winds may injure vegetation by the pressure due to velocity, but strength as ordinarily measured is of less consequence than the periodic variations whose maxima seem to range to about double the average velocity.

The wetting and matting of leaves by rain may greatly increase resistance and thus facilitate injury.

The presence of water in the wind may augment the force to a very small degree if rain fall is constant but to almost any degree if intermittent, or if given an intermittent effect by sweeping action of currents.

The combination of intermittent wind, intermittent rain fall and well soaked foilage would seem to effect the greatest damage, while the average wind velocity, though necessarily high, would be of minor importance.

Upon the same subject Mr. R. A. Parke contributed the following deductions:

THE RELATIVE WEIGHT OF RAIN AND AIR

A bulletin of the Government Meteorological Bureau, upon the winds which often precede heavy rain storms, gives an expression for the velocity of falling rain drops, deduced from Price's Theory of Projectiles. It was found by this investigation, that the velocity of falling rain

drops is represented by the square root of the quotient obtained by dividing the product of the volume of the drop and the acceleration of gravity, by the product of the density of the surrounding atmosphere and the area of a horizontal cross section of the drop.

Assuming the form of the drop to be spherical, if d represents the diameter of the drop in inches, D represents the density of the surrounding air, with reference to water, and v represents the velocity of the falling drop in feet per second, it is easily deduced from the above formulated expression that the velocity of the falling drop, $v = \left(\frac{32.16d}{18D} \right)^{1/2}$. For a given fall of rain, per unit of time, therefore, the weight of water contained in each cubic foot of space (being inversely as the velocity of fall), varies directly as the square root of the diameter of the rain drop. The weight of a cubic foot of atmospheric air itself varies directly as its density; thus, for a given rate of rainfall, the ratio of the weight of rain to the weight of air, in a cubic foot of space, is greatest for small rain drops and for a low density of the air. It is apparent, therefore, that the mass of water in one cubic foot of space will bear the greatest ratio to the entire mass of air and water in the same space, when the temperature is fairly high and the barometric pressure is low. In order to make this ratio as great as is consistently possible, it will be assumed that the temperature is 70° Fahr. and that the barometric pressure is but 28 in. Under these conditions, the weight of a cubic foot of rain water is 62.3 lbs. and the weight of a cubic foot of air is .06883 lbs; wherefore, the relative density of the atmosphere, $D = \frac{.06883}{62.3} = .001105$, and the velocity of the falling drops would be $(1617 d)^{1/2}$.

If the diameter of the spherical drop, d , = .2 inches, then v = 18 feet per second.

If d = .1 inch, then v = 12.7 feet per second.

A rain fall of four inches per hour may be regarded as exceptionally great, even in the heaviest storms. At the rate of

four inches rain fall per hour, the rain fall per second = $\frac{4}{3600}$ inches = $\frac{1}{900}$ feet.

Assuming that the rain drops, for even such an unusually heavy rain fall, have a diameter of but 0.1 inch, the precipitation of the water content of 12.7 cubic feet of space amounts to but $\frac{1}{10800}$ cu. ft.; or, in other words, the volume of water contained in each cubic foot of space is $\frac{1}{12.7 \times 10800} = \frac{1}{137160}$ cu. ft.

The weight of this water is $\frac{62.3}{137160} = .000454$ lb.

The weight of one cubic foot of air (as above found) is .06883 lb. The maximum ratio of the weight of rain, per cubic foot of space, to that of the air in the same space, may therefore be considered as $\frac{.000454}{.06883} = .0066$, or two-thirds of 1 per cent.

The pressure of the wind or the water, or a combination of the two, against a plane vertical obstacle, such as a wall, varies directly as the mass, or the weight, other things being equal. Therefore, the maximum quantity of water, in the form of rain, which may be present in the atmosphere, would add a pressure of only two-thirds of 1 per cent. to that of the wind pressure alone, without the rain, against such a vertical obstacle. In dry winds, under normal barometric pressure of 29.92 inches, the weight of a cubic foot of air would, at the same temperature, be .07494. With the same velocity of the wind, therefore, it would seem that a vertical plane obstacle would have to resist a considerably greater pressure from a dry wind, than from any wind, which by reason of low barometer, would be likely to contain a comparatively large amount of rain.

If the hypothesis of the presence of one tenth of 1 per cent., by volume, of water, as rain, in the atmosphere, be accepted, the following conditions must prevail:

Each cubic foot of air contains .001 cu. ft. of water; if the velocity of fall be only 12.5 ft. per second, the precipitation per second must be .0125 cu. ft. per square foot of horizontal surface; the precipitation per minute is therefore $60 \times .0125 =$

.75 ft.

The precipitation per hour = $60 \times .75 = 45$ feet!

The foregoing investigation was completed in March, 1894. Since that time, some experiments have been conducted by Mr. O. J. Marstrand, member American Society of Civil Engineers, the results of which are compared with those of Prof. Langley, recently published in the American Journal of Science, and are reported in the Engineering News of Feb. 14th, 1895.

The writer has deduced from these experiments, an expression for the velocity of falling rain drops, for comparison with that given in the Bulletin of the Meteorological Bureau. This investigation demonstrates the entire inapplicability of the formula above used for the velocity of falling rain drops. That formula for the velocity of falling rain drops is apparently established upon the assumption that the resistance offered by the atmosphere to a spherical body is the same as that which would be offered to a plane surface, the area of which is that of a gravity section of the sphere. It has long been known that a sphere resists the action of the wind far less than its plane projection, its resistance having generally been assumed to be 25 per cent, of that of its plane projection. With this corrected formula for the velocity of the falling drops, it appears that the velocity in each case should be 1.8 times as great as that above computed and the total rain fall which must accompany the presence of a volume of one-tenth of 1 per cent. of moisture in the atmosphere is 81 feet per hour.

The actual influence of the presence of moisture in high winds, upon the destruction of vegetation, appears to depend, in greater measure, upon the other considerations, suggested in Mr. Kerr's paper of last year. In a dry wind, the foliage of trees is acted upon much the same as is a weather vane, the leaves pointing in the direction of the receding air. The effective surface presented to *direct* wind resistance is very small, and the total resistance may be regarded as

the sum of this direct resistance of the edge of the leaf and that due to skin friction, as the air moves along its surface. The vibratory undulations of the leaf would be, to some extent, similar to those of a pennant floating in the wind, so that the skin friction would be considerably greater than the edge resistance of the leaf to the wind.

The presence of moisture in the wind would undoubtedly tend to cause the leaves to adhere together by capillary attraction, when they have once come into contact, and they would thus be prevented from assuming a position in which they would offer the least resistance to the wind. The character and luxuriance of the foliage, the amount of water present in the wind, and the velocity of the wind, would all appear to be factors in determining the extent to which matting of the leaves would take place. A mechanical or mathematical investigation of this phase of the question is evidently hopeless; but it would appear quite clear that the resistance offered by matted foliage might easily be from ten to perhaps fifty times the resistance offered by the same foliage in a dry wind.

The matting of the foliage might easily also present favorable conditions for the accumulation of the rain water in considerable weight, which, with the foliage deflected to the leeward of the trunk of the tree, would also have a strong tendency toward fracture of the branches, or of the trunk, or to assist in up-rooting the tree.

Mr. Wm. T. Davis read the following memorandum and exhibited the arrow-head referred to:

INDIAN RELICS AT NEW SPRINGVILLE.

Mr. John J. Corson has collected a number of Indian implements on his farm at New Springville, among them being an iron arrow head, the first of the kind reported from the Island. The Indians resided on the upland just east of the Great Swamp, as indicated by oyster shells and the location of many of the implements.

Some years ago a heavy freshet unearthed a number of Indian remains on the edge of the meadow at New Springville, and Mr. Corson was given a skull, presumably that of an Indian, which had been dredged by a fisherman from one of the salt water creeks leading up to the village. It is, however, not certain that this skull was uncovered by the freshet along with the other Indian bones.

MINOR NOTES AND MEMORANDA.

In commenting upon Mr. Davis' memorandum, Mr. Geo. H. Pepper stated that a single iron arrow head had been found personally at Tottenville, but had been lost. Mr. Pepper exhibited a stone axe and knife, recently found at Totten-

ville, also a portion of a Drift boulder from the same locality, consisting almost entirely of a mass of *Orthis testudinaria*.

Mr. P. B. Cooke read an account of a visit to Staten Island by Jasper Dankers and Peter Sluyter, as given in "Journal of a Voyage to New York and a Tour in several of the American Colonies in 1679—80"; translated from the original Dutch manuscript for the Long Island Historical Society.

Mr. Arthur Hollick exhibited a piece of Cauda-Galli grit, containing markings of a *Spirophyton*, found in the moraine near Rosebank station.

The president designated Mr. R. A. Parke to edit the current issue of the Proceedings.

PROCEEDINGS

OF THE

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

VOL. IV. No. 16.

APRIL 13th, 1895.

Meeting held at the residence of Mr. Arthur Hollick, Fourth avenue, New Brighton. The president in the chair.

Mr. H. W. Congdon tendered his resignation as Curator, which was accepted and the following minute adopted :

"Upon the retirement of Mr. Congdon as Curator, owing to removal from the Island, it is Resolved, that the thanks of the Association be tendered to Mr. Congdon for his efficient services, not only in the performance of the routine duties of that office, but for his especial zeal in placing our library and collections in their present excellent condition."

On motion, Mr. H. Cleaver Brown was elected Curator to fill the unexpired term of Mr. Congdon.

The following new members were elected: Eric T. King and Jack Crawford, Rosebank; Chas. L. Seeger, Chas. D. Freeman, E. C. Bridgman, John J. Boyd and Dr. Jefferson Scales, New Brighton. The following, who were among the organizers of the Association, were re-elected; Bradish J. Carroll, W. G. Berry, G. W. Wright, E. C. Delavan, Jr., E. F. Neilson and Ernest F. Birmingham.

Mr. George H. Pepper exhibited a quantity of fish bones and scales and read the following paper:

DISCOVERY OF A CACHE OF FISH REMAINS AT TOTTEENVILLE.

The mere mention of the discovery of a cache of fish bones in an aboriginal shell heap is enough to excite the interest of anyone who is interested in archæology, and I am pleased to exhibit the contents of such a cache from Tottenville.

Mr. Marshall H. Saville, curator of

archæology in the American Museum of Natural History, New York, in a lecture delivered at the museum during the past winter, mentioned this cache as a very rare and interesting find, and as it is so unlike any of the archæological material brought before our Association in the past, any facts or theories concerning it will doubtless prove of interest.

This cache, or deposit of fish remains, was found September 30th, 1894, in the field where the skeleton, described in our Proceedings for Nov. 10th, 1894, was unearthed. I had made a careful examination of the surface deposits, which yielded a goodly supply of arrow points, hammer-stones, and net-sinkers, and had found a few specimens in the shell-stratum in the face of the bank; so on the strength of these finds I concluded that an examination of the shell stratum underlying the field would possibly yield valuable results. That my anticipations have been realized can be readily seen by this mass of scales and bones which have so successfully withstood the ravages of time.

The excavation made measured about four by five feet, and the layer of shells at this point was a foot and a half below the surface. The surface soil was rich and contained quantities of broken shells and calcined stones; it rested upon the stratum of shells, which ranged from a few inches to half a foot in thickness.

The shells were matted together as though an enormous pressure had been brought to bear upon them; so firmly were they interlaced and so tenaciously did they adhere to one another that it was almost impossible to detach a shell from the mass, save with the trowel. Shells of various kinds were found, some

of which were quite friable, while others were intact and well preserved. Numerous potsherds were brought to light, and associated with them were deer and other animal bones.

The deposit was circular in form, being about a foot and a half in diameter and two inches thick; it rested in a horizontal position and was of a uniform thickness throughout its area. It was lying in yellow sand about a foot below the level of the matted shells, and though small shells and a fragment of pottery were in the mass, no shells were over it and the shell stratum ended abruptly on a line with its outer edge.

The motive for thus burying them is more or less of a problem, for beyond the fact that they are the skeletons of fishes caught and subsequently deposited there by the Indians we know but little. To one versed in ichthyology it would have a certain fascination, however, and a careful examination of the various parts would, no doubt, lead to the determination of many species, which would add to the value of the find.

After the presentation of the above paper a large number of sample tubes were shown, neatly filled with selected scales and bones of the various kinds found in the cache, and mounted specimens of scales, prepared by Mr. Thomas Craig, were exhibited under the microscope.

Mr. Wm. T. Davis exhibited specimens of Luna Moths and read the following paper:

SCARLET-MARGINED LUNA MOTHS.

The Luna moth (*Actias luna* L.) is at least partly double brooded on the Island. A specimen has been taken in April, and on August 12th, 1890, I found one in the valley of Reed's basket-willow swamp which had just emerged from the cocoon. In addition to this Mr. Chas. W. Leng's son found, about Aug. 1st, 1893, a Luna caterpillar on a walnut tree growing near his home, and put the insect into a paper box, where in a few days it spun a cocoon. About the 19th of August it was heard flapping about in the box, and on

the 22nd I saw the battered remains of this male Luna.

On the 1st of May, 1887, a male Luna was found hanging to a fence along the Serpentine Road, and on April 20th, 1891, another male Luna, which had been captured out of doors on Grimes' Hill, was given to me. These two individuals differ considerably in color from those hatched later in the year, both the fore and hind wings being margined with dull scarlet. In the form which comes later, the costal margin of the fore wings is purple, with occasionally the same color on the edges of the hind wings, and the dull scarlet is entirely wanting.

Many Luna moths have a sub-marginal band extending across both wings. In the large collection of the American Museum there are some yellow forms and other aberrations, but none seen had the edges of the wings of the same color as the two Staten Island specimens collected in April and May. Seasonal forms are quite common among insects, and it may be that the scarlet-margined Lunas only appear in the spring. Certainly none have been collected on the Island at any other season.

Mr. H. W. Congdon read the following: FURTHER NOTES ON THE NESTING OF THE BARRED OWL ON STATEN ISLAND.

In our Proceedings for April 14th, 1894, Mr. Hollick records a set of the eggs of the Barred Owl, taken from a nest which has been under observation for five years.

On March 16th of this year, in company with Mr. H. L. Beadel, I visited this nest, finding the usual complement of three eggs,

The nest is about thirty-five feet above the ground, in a living oak, about two and a half feet in diameter, in a hole left by the breaking of a large branch from the trunk. The nest itself is but a few inches below the level of the hole, and consists of shreds of cedar bark matted together into a felt, and lined, perhaps accidentally, with the owl's own feathers. In shape it is like an inverted cone, with quite straight sides; the eggs consequently lie close together and cannot roll.

On tapping the tree-trunk the old bird flew off, alighting for an instant about forty yards away, and then moving off to about one hundred and fifty yards, whence it flew entirely away. Its mate was not seen at all, and neither were any cries heard. Upon blowing the eggs it was found that one was perfectly fresh, and that in the others incubation had but just begun. They measured 1.98 x 1.72; 1.89 x 1.69; 1.83 x 1.65 respectively.

It is worthy of note that this species is so strongly attached to its home that it will return to the same nest year after year, even under the most adverse circumstances.

Mr. Hollick exhibited the set of three eggs obtained from the same nest March 17th, 1894, as noted in the Proceedings for April 14th, 1894, and referred to the following memoranda:

The nest was first discovered by Mr. Charles R. Harte, March 27th, 1891, who obtained from it a set of three eggs, almost hatched, as noted in the Proceedings for April 11th, 1891. The same gentleman obtained another set of three, in which the incubation had hardly begun, on March 12th, 1892, as noted in the Proceedings of April 9th, 1892. In 1893 the nest was not examined. It will be a matter of interest to keep track of this pair of birds in the future.

MINOR NOTES.

A cannon ball, about $3\frac{1}{2}$ inches in diameter, was shown, presented by Mr. Roy Osborn, through Mr. Silas N. Havens, by whom it was found in a gravel excavation on Glen avenue, New Brighton. It is probably of Revolutionary age and was found in the same locality as the one noted in our Proceedings for March 13th, 1890.

Mr. Hollick exhibited another, somewhat smaller, found many years ago near the site of the old British fort on Fort Hill.

Mr. Hollick presented specimens of *Tussilago Farfara* L. with the following memorandum:

Last autumn Dr. N. L. Britton found the large leaves of this plant on the north side of the Richmond road, near Garretts, and reported the discovery as an addition to our flora, at the meeting of Nov. 10th, 1894. We kept the matter in mind and on March 31st of this year examined the plants and found them in full blossom. In common with others of our introduced species it flowers very early, thus often escaping notice.

Mr. Pepper presented fragments of a Helderberg limestone boulder, containing characteristic fossils, found at the Tottenville bluff.

PROCEEDINGS

OF THE

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

VOL. IV. No. 16.

(SPECIAL No. 20.)

APRIL 13th, 1895.

LIST OF ORGANIZERS AND ACTIVE MEMBERS

The printing of this list was deferred from last month in order that the names of any members elected at the April meeting could be included.

ORGANIZERS OF THE ASSOCIATION, Nov. 12th, 1881.

W. G. BERRY.	E. C. DELAVAN, Jr.
ERNEST F. BIRMINGHAM.	SAMUEL HENSHAW.
N L. BRITTON.	ARTHUR HOLLICK.
CHAS. W. BUTLER. *	CHAS. W. LENG.
Dr. A. L. CARROLL.†	E. F. NEILSON.
BRADISH J. CARROLL.	SANDERSON SMITH.
WM. T. DAVIS.	G. W. WRIGHT.

ACTIVE MEMBERS.

<i>Name and Address.</i>	<i>Date of Election.</i>
AHLMAN, OTTO, Stapleton	1894
BERGEN, F. H., St. Mark's place, New Brighton	1893
BERRY, W. G., Criminal Court Building, New York	1881
BIRMINGHAM, E. F., Stuyvesant place, New Brighton	1881
BOYD, JOHN J., Tompkins avenue, New Brighton	1895
BRIDGMAN, E. C., 14 Tompkins avenue, New Brighton	1895
BRITTON, Dr. N. L., Columbia College, New York	1881
BROWN, H. CLEAVER, Curator, 6 Henderson ave., New Brighton, .	1893
CARROLL, BRADISH J., 202 W. 74th street, New York	1881
CLARK, H. F., New Brighton	1894
COOKE, P. B., 22 Westervelt avenue, New Brighton	1895
CONGDON, E. A., Drexel Institute, Philadelphia	1881
CONGDON, H. W., 194 Clinton street, Brooklyn	1893
CORSON, JOHN J., New Springville	1893
CRAIG, THOS., Treasurer, Vine street, New Brighton,	1889
CRAWFORD, JACK, Clifton, (Rosebank P. O.)	1895
DAVIS, MORGAN, Tompkinsville	1884
DAVIS, WM. T., Trustee, Stuyvesant place, New Brighton,	1881
DELAVAN, E. C., Jr., Westervelt avenue, New Brighton	1881
DUPUY, GEORGES, 50 Westervelt avenue, New Brighton	1893
FABER, EBERHARD, 545 Pearl street, New York	1881
FABER, LOTHAR W., 545 Pearl street, New York	1881

*Resigned.

†Deceased.

FEARON, R. J., Richmond terrace, New Brighton	1881
FREEMAN, CHAS. D, Stuyvesant place, New Brighton	1895
GAY, MARTIN, West New Brighton	1893
GEOFFROY, O. C., West New Brighton	1892
GRATACAP, L. P., Bement avenue, West New Brighton	1881
HEINEKEN, W. P., Livingston place, West New Brighton	1894
HENSHAW SAMUEL, Manor road, West New Brighton	1881
HOLLICK, ARTHUR, Secretary, 4th avenue, New Brighton,	1881
HOLLICK, Dr. F., 4th avenue, New Brighton	1881
HUMPHREY, ROBT. New Brighton	1884
HUNT, C. W., West New Brighton	1881
HUNT, FRED. F., St. Mark's place, New Brighton	1894
JENKINS, W. J., Stapleton	1894
JOHNSTON, A. K., Prince's Bay	1893
KADLETZ, J., Garrettsons (Dongan Hills P. O.)	1891
KENNEY, JOHN J., New Brighton.	1889
KERR, WALTER C, President, Central avenue, New Brighton,	1892
KING, Capt. A. L, Clifton, (Rosebank P. O.)	1881
KING, ERIC T., Clifton, (Rosebank P. O.)	1895
KOLFF, CORNELIUS G., 32 Broadway, New York.	1895
KUNHARDT, W. B., 32 Beaver street, New York	1885
LENG, CHAS. W., 119 Columbia street, West New Brighton	1881
LOW, E. LYMAN, 48 Davis avenue, West New Brighton	1894
MORRIS, IRA K., West New Brighton	1888
MORRISON, HENRY P., West New Brighton	1893
MULLER, EDWARD M., Clinton avenue, New Brighton	1893
NEILSON, E. F., Richmond Terrace, New Brighton	1881
NEWELL, K. B., 19 Central avenue, New Brighton	1888
NORVELL, D. R, Stuyvesant place, New Brighton	1893
PARKE, R. A., Lenox place, New Brighton	1893
PEPPER, GEO. H., Totienville	1893
RICE, JAS. F., 412 9th avenue, New York	1894
ROBERTSON, WM. F., 77 Pine street, New York	1894
SAMUEL, MARK, 10 E 16th street, New York	1893
SANTRY, JOHN J., New Brighton	1893
SCALES, Dr. JEFFERSON, 93 Tompkins avenue, New Brighton	1895
SCHNARR, L., Brooks avenue, West New Brighton	1882
SEEGER, CHAS. L., Tompkins avenue, West New Brighton	1895
SIMONS, CHAS. F., Stapleton	1888
SKINNER, F. W., Sherman avenue, New Brighton	1893
SMITH, SANDERSON, New Brighton	1881
STEVENS, C. J, 7 Bowling Green, New York	1895
STOLBRAND, VASA E., Stapleton	1893
TAYLOR, G. C., Manor road, West New Brighton	1885
THOMPSON, JOS. C., Clifton (Rosebank P. O.)	1889
TOWNSEND, Dr. C. W, St. Mark's place, New Brighton	1893
TWIGGS, HENRY L., Eltingville (Seaside P. O.)	1893
TYSEN, DAVID J., New Dorp	1893
WALSER, Dr. WM. C., Livingston place, West New Brighton	1887
WATROUS, ELIZABETH N., 352 Lexington avenue, New York	1894
WHITEHOUSE, GEO. M., New Brighton	1895
WRIGHT, G. W., West New Brighton	1881

PROCEEDINGS
OF THE
NATURAL SCIENCE ASSOCIATION
OF STATEN ISLAND.

VOL. IV. NO. 17.

MAY 11th, 1895.

Meeting held at the residence of P. B. Cooke, Westervelt avenue, New Brighton. The president in the chair.

Mr. Wm. T. Davis exhibited mounted specimens of *Aralia nudicaulis* L., with emarginate leaflets and read the following note :

NOTCHED LEAFLETS IN ARALIA.

In Gray's botany the leaflets of the Wild Sarsaparilla (*Aralia nudicaulis*) are described as "oblong-ovate or oval pointed, serrate, 5 on each of the three divisions." In the woods northwest of the Amboy Road at Oakwood many plants were noticed last spring, on which the leaflets were rather deeply notched at their apices and bore but little resemblance to the normal form. The number of the plants showing this peculiar leafing was remarkable and on many of them not even a single specimen of the normal shape was to be found. This peculiarity may be an unrecorded variation, like those well known in the *Sassafras* and in *Clematis ochroleuca* Ait. It does not seem to be due to wood fires, which often cause, as in *Rhus glabra* L., considerable change in the forms of the leaves, for in this instance plants growing on recently burnt places had leaflets of the usual shape

A LARGE LOBSTER.

Mr. Davis also exhibited a large claw of a common lobster, taken off the New Jersey coast, by Gustave F. Swainson, a Staten Island fisherman. In this instance the crustacean had grown to an enormous size, and had not cast its shell for several years. The claw measured between eleven and twelve inches in length, seven inches in width and nearly sixteen inches in circumference.

BLACK SAND.

Mr. Walter C. Kerr exhibited a sample of a massive black mineral substance with the following memorandum: While tramping today along the beach near Huguenot Mr. William T. Davis noticed and called attention to large masses of black material, quite hard yet yielding to a knife, seeming like compact black sand, or magnetite, which occurs in abundance about half a mile farther down the beach. A weak magnet however did not attract it, hence doubt as to its being magnetite, and with hydrochloric acid sulphuretted hydrogen was not evolved, hence little probability of its being pyrrhotite, which was recently found to be the coating of the black sand reported in the Proceedings of January last. This sample will be duly examined and described later.

A LARGE TURTLE.

Mr. Kerr also mentioned that his daughter Eleanor had today found a large snapping turtle, (*Chelydra serpentina* L.), near Wolf's Pond, Princes Bay, measuring thirty-two inches long from the end of the nose to the tip of the tail. The shell measured thirteen inches in length by eleven in width; measuring, however, over the crown, the shell was thirteen inches wide. The head was nine inches and the tail ten inches long. This is very nearly the size of the one mentioned in our Proceedings for May 9th, 1889. The turtle had apparently died a natural death, there being no marks of violence, and probably only a few hours previously.

ALBINO VIOLA SAGITTATA AIT.

Mr. Arthur Hollick exhibited albino specimens of *Viola sagittata* together

with typical specimens of the species and of *V. lanceolata* L., for purposes of comparison. The albinos were found in considerable numbers on the top of one of the dry morainal hills near Grasmere, where they formed a conspicuous white patch in the midst of the common blue ones. Dr. N. L. Britton reported that a pink variety of the species had recently been found.

CLAY IRON-STONE CONTAINING CORBULA

Mr. Hollick also exhibited specimens of clay iron-stone containing quantities of a *Corbula*, found at Perth Amboy, N. J., at the junction of the Cretaceous clay and overlying Drift, where a railroad cutting has recently been made. The species is apparently the same as that of specimens previously found near the same locality, as noted in the Proceedings for January 9th, 1892. Similar specimens should be found on Staten Island.

CONOPHOLIS AMERICANA (L. f.) WALLR.

Dr. N. L. Britton presented specimens of *Conopholis Americana* representing the remains of last year's

plants, found by Mr. John H. Stottler, near Garrettsons, April 23rd—an addition to the flora of the Island. Dr. Britton remarked upon the structure, affinities and distribution of the species.

INDIAN IMPLEMENTS FROM TOTTENVILLE.

Mr. George H. Pepper exhibited a stone knife, made from yellow jasper, and a hoe made from silicious shale, found at Tottenville, May 5th. The type of hoe is a common one in the Eastern States, but has not been previously reported from the Island.

INDEX TO RECENT LITERATURE RELATING TO STATEN ISLAND.

The New York Times of April 21st, 1895, contains a three page illustrated article about the Island, but somewhat more enthusiastic than the actual facts would seem to warrant. The article was evidently designed to boom real estate and is typical of its kind. Several of the sketches are excellent, however, and these will be of interest in the future.

PROCEEDINGS

OF THE

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

VOL. IV. No. 18.

JUNE 8th, 1895.

Meeting held at the residence of Dr. N. L. Britton, New Dorp.
The president in the chair.

The following new members were elected: Howard R. Bayne, M. E. De Jonge and Bernard Eekhout.

The president, Mr. Walter C. Kerr, read the following communication:

A PROPOSED COUNTY PARK SYSTEM.

The earliest accounts of Staten Island describe it as so thickly wooded as to be almost impenetrable, and its Indian name, Aquehonga Manocknong, has been interpreted to mean "the place of bad woods." Today its woods are being wasted, sometimes to a purpose, often to none, and there is many a locality once luxuriant with vegetation to which the Indian could have applied his term "bad woods" without implying any sense of inferiority which now may be appropriately called a bad place where there once was woods.

We recognize that with the advance of civilization nature must be despoiled to make way for necessities, chiefly our farms and villages; but when the good land has been cleared there usually remains a considerable area, timbered, watered and cultivated only in its wildness, which is of little value for any purpose except to preserve the beauty of the flora and furnish a home for the fauna.

This is the condition in which Staten Island is now placed and if early provision is made to allow the remaining vestiges of nature to flourish undisturbed it will forever remain beautiful, even though none of the preserved areas are large. Their size, however, is sufficient if only reasonable precautions are taken in time to prevent the further devastation of axe and fire.

One familiar with the by-ways and

hedges of the Island cannot fail to notice many areas which of recent years have been cleared apparently for no other purpose than the almost worthless handful of wood which they yield. Often the land is too rough for cultivation, fire follows the axe and after it there rises a tangle of undergrowth and weeds than which nothing could be more unsightly.

The Island is about entering upon a period of change leading to the settlement of the interior portions, land values will doubtless change and in most cases increase. If there is to be a move in the direction of saving the good, the true and the beautiful, it must be made without delay.

Too often indifference permits the work of destruction to proceed until it is forever too late or until the ruthless waste of opportunity can only be repaired at an expense almost too formidable to be undertaken. A visit to a new park in the suburbs of Syracuse, New York, will illustrate this. Many years ago the rolling hills were grandly wooded and could have been acquired at a nominal cost, yet it was only after they had been reduced to a barren waste that they became the park of a population of 90,000 people at an expense perhaps one hundred fold. Within this park stands a small grove of the original forest trees—a sample of what the remainder may become in fifty years

or more.

The Natural Science Association, composed of those who are interested in the natural resources of the Island, can perhaps take the initiative in this matter more properly than any other body, especially as such interest will by all be known to be free from personal or political ends. The ownership of property which now should be preserved cannot be longer entrusted to accident or to private hands.

It is scarcely fessible for the several villages to provide parks within the borders of the remaining wood-land, nor is it practicable or necessary for the county to make the expenditure required to at once establish a series of parks with all the attendant expense of immediate improvement.

There is, however, a step which seems within the province of the county, and possible now with a minimum of expense, which in future years would be regarded as prudent forethought. The project is simple and involves only the purchase by the county, at reasonable prices, of various tracts to be held as public land and eventually, when the county becomes more densely populated, to become a park system joined by our county roads; thus retaining for this Island, which nature intended to be beautiful, so much of its natural charm as man has not destroyed.

It may be remarked that an Island presents exceptional advantage for such a project. Its very isolation makes it a thing apart and gives it a distinctive character not possessed by areas which merge identity indefinitely into others. The identity of the Island and the county favors the accomplishing of the project along simple lines of procedure, while the proximity to densely populated centers enhances the value of the results which would follow successful consummation.

If the people wish to retain in their midst the natural surroundings which no one fails to appreciate they have only to make it their will and it can be done. At no time in the future can it ever be accomplished so cheaply as now. No

public expenditures can secure so great a permanent value as that made for land, which not only retains its value but enhances when wisely utilized. Some districts thus obtained would lie sufficiently close to the large villages that within a reasonable time they could be transformed into conventional parks. The larger and more distant tracts, however, would possess, as the years go by, an interest far greater than any conventional park could yield, for with the extensive flora of this Island, including 1,320 plants out of about 1,800 in the whole State, a little care and skill would soon convert these areas into botanical museums without destroying their rugged wildness.

In this respect a word may not be amiss concerning the advanced and most practical ideas of what should constitute a park. The days of gravel walks, iron benches and notices to "keep off the grass" have passed, while landscape gardening has in the hands of masters of the art become largely the preservation of nature rather than supplanting it with forced growths. Asphalt drives have yielded to woodland roads while paths wind through the valleys and between the trees instead of the trees bordering paths laid out in geometrical lines and curves. One of the oldest parks in Chicago is being modified from its conventional character and devoted to the display of native wild plants and flowers that grow or have grown within twenty-five miles of the city.

Even the more scientific aspect of modern woodland preservation meets more popular approval than even those who approve often suspect, for stripped of the scientific terms natural science is only the correct observation and interpretation of what grows about us. The wise and ignorant only differ in degree in such observation. To no one is science so uninteresting that they fail to appreciate the information that a certain tree before them grows nowhere in the State except on Staten Island or that the flora of this immediate locality is especially enriched by the lapping over of a more northern and a more southern one.

Parks as an admitted educational factor in any community need no defense or even explanation, but to reach their full development they should appeal equally to the boy at play, the man seeking recreation and the scientist who will travel far to view rare specimens. Few outside the Natural Science Association know how many such journeys are now made in our midst, but the fact that out of about 125 trees exhibited in the New York forestry exhibit at the World's Columbian Exposition twenty were selected from Richmond County will indicate the esteem in which our flora is held. Shall we preserve it?

Upon the acquirement of the property an arrangement in the interest of economy could doubtless be affected, providing the authorities approve, whereby the Association would assist in caring for these lands in such a manner as to render the expense merely nominal. The duties would necessarily include visiting such lands at stated intervals, making written reports upon their condition, furnishing evidence of destructive trespass, if any, and performing all the duties which would be required in the scientific care of such property.

The county on the other hand would be called upon only to provide suitable notices against trespass or mutilation and to prosecute offenders, and perhaps clear certain woodland roads for accessibility.

The stability of this association, as indicated by its twelve years of corporate existence, with monthly publications, and its membership of over seventy-five, would be a guarantee to the county of the care which such property would receive until such time as the pressure of civilization demanded such improvements as would require salaried officers.

If much land were purchased, it could be so divided as to include many of the characteristic features of the Island, including the notable spots of artistic, scientific and historic interest. If, however, it could not be sufficiently extended for this, certain classes of plants and young trees could be moved from present localities to new ones before they became extinct.

The members of this Association could furnish valuable assistance in selecting the tracts which it would be advisable to include. They should be distributed throughout the several townships as equitably as possible and be readily accessible by the county roads. They should include upland and lowland, fresh and salt water. Considered collectively, even without much change from their present condition, they would form an arboretum whose size, beauty and scientific interest would in time become famous.

This project once initiated would doubtless gather to itself moderate sized tracts by donation as have similar projects elsewhere. Some have been given from philanthropic motives and others to benefit adjacent property. Such tracts, in connection with the larger ones, round out the system and enhance its value.

The institution of park systems is becoming more common throughout the country, but perhaps the most extended enterprise of this nature is that undertaken by the city of Boston, through the Metropolitan Park Commission appointed in 1892, and whose handsomely illustrated reports are submitted for inspection. Over 5,000 acres of land have been acquired at a cost of about one million dollars, and improvements aggregating another million have been made. The thoroughness with which this work has been undertaken is instructive, while expenses aggregating hundreds of thousands of dollars to acquire right of way and to remove obstacles sound warning that such projects cannot be commenced too soon.

The matter of expense cannot be emphasized too strongly. The history of such projects is told in the vast sums expended to accomplish at the eleventh hour what could have been done originally for a song. A small fraction of the penalty Boston is paying for delay would provide park systems for several Staten Islands. No community can expect to maintain a high standard and corresponding land values without public and beneficial improvements. This county can

delay if it chooses and its citizens can display a lack of business prudence by indifference. Parks will exist on this Island some day at tenfold the present cost if the land is not obtained now. We can be wise or foolish.

The proposition to establish parks is not new. When the famous landscape architect, Frederick Law Olmsted, was one of our citizens, he was the chairman of an advisory committee to "The Staten Island Improvement Commission," and in a printed report of that committee dated January 12, 1871, he submits a carefully considered plan for "An Eastern Water Preserve and Public Common" and "A Western Water Preserve and Public Common." The details are worked out elaborately in connection with water supply and drainage, which important factors are now receiving their deserved attention by the health committee appointed by the Good Government Club.

It would be interesting to review the expert consideration which Mr. Olmsted has given to the subject were it practicable in this article. One quotation, however, will indicate the advice of America's greatest authority on such subjects :

"The advantages of such a public ground in giving increased value to all public property on the Island we hardly need argue. It is sometimes said, however, that the Island is a park in itself and has no need of any special public ground. It may be pertinent, therefore, to recall the fact that no part of the Island is today more of a park than Rocky Hollow, or the Bloomingdale road north of Union Square, or the greater part of the Twenty-first ward of New York was, fifty years ago. Nowhere on Staten Island is there a landscape or even a glimpse of agreeable scenery which belongs permanently to the public—which no man has the right to obstruct and destroy in pursuance of private and selfish ends."

The project is so simple as to require little beyond the expressed public desire to do it. Those who, like the members of this Association, have a realizing sense of how little of the eastern United States will be spared to show what it once was, fully

appreciate the for reaching nature of such a plan. Most public projects have for an object, or at least for their effect, the advantage of one locality against another. This, however, has no preference, and it would benefit every remaining square foot of land on this Island if certain portions were thus set aside for preservation.

It may scarcely be within the province of this association to take active part in such a matter, but if by publication of this suggestion its members can urge its necessity, voice their interest and pledge their co-operation, it may be considered as the sowing of seed which through public approval will bear fruit.

Mr. Kerr requested suggestions and criticisms and after discussion by several of the members the following preamble and resolutions were adopted :

WHEREAS, It is the sense of this Association that the time is ripe for action to be taken looking to the acquirement of lands preparatory to the establishment of a county park system, and

WHEREAS, At a conference held at the house of the President of this Association, on June 6th, 1895, between the Executive Committee of the Association and an advisory body of citizens, who were present by invitation, it was unanimously agreed that the project of securing park lands should be diligently consummated, and

WHEREAS, It was the sense of those present at said conference that this Association should appoint a committee to develop and execute a proper plan of procedure, therefor be it

Resolved, That this Association hereby authorizes its Executive Committee to appoint a committee of five members, with power to take such action as may be deemed advisable in advancing the project of securing a park system for Richmond County, and that said committee be authorized to add five citizens, not members of the Association, to its number.

Resolved, That the Executive Committee be authorized, if deemed advisable, to add other members of the Association to said committee.

Resolved, That the President of the Association be made an additional member of said committee.

MINOR NOTES.

Mr. Kerr exhibited specimens of *Euphorbia Esula* L. and *Silene noctiflora* L. with the following memoranda :

Euphorbia Esula. This species of

spurge is given a range by Gray from "Massachusetts to western New York and Michigan; rare," and has not hitherto been reported from our Island. On May 26th, I found it growing in abundance on the knoll about two hundred feet west of Arrochar station where it has spread until it is the most abundant weed. The locality was once cultivated but is now covered with a rather thick growth of wild plants, with which may be found a few cultivated ones. This spurge may be a remnant from cultivation, but it is more probable that its presence is accidental and its present growth would indicate that its spread is rapid. I think it may properly be listed as one of our introduced plants.

Silene noctiflora. Growing with the spurge before mentioned, is an abundance of this night-flowering catchfly, which is doubtless a remnant of former cultivation. While not new to the Island it has only been reported from New

Dorp Lane and a garden in New Brighton, hence Arrochar is a new locality.

Dr. Britton exhibited a number of human bones recently exhumed near Rossville, and presented by Miss Seguire and Miss Hughes. They were supposed to be portions of Indian skeletons, but Mr. Joseph C. Thompson declared them to belong to white men. The matter was referred to Mr. George H. Pepper for investigation and report.

Mr. Wm. T. Davis called attention to the fact that there was a killing frost on the Island, during the night of May 17th, and suggested that it should be recorded. Its effects were noticeable on the north side, where the young leaves of cat briers, hickories and *Clethra* were withered, also peas and tomatoes. The portion of the Island south of Ocean Terrace and Richmond Hill suffered but little.

PROCEEDINGS

OF THE

NATURAL SCIENCE ASSOCIATION

OF STATEN ISLAND.

VOL. IV. NO. 19.

SEPT. 14th, 1895.

Meeting held at the residence of Mr. Wm. T. Davis, New Brighton.

The President in the chair.

Rev. Wm. H. Rice, New Dorp, was elected an active member.

Several members called attention to the death, since the last meeting, of Mr. Mark Samuel, and, on motion, the following minute was adopted :

Mr. Mark Samuel, an active member of this Association, died on June 10th, while visiting his sister at Pompton, N. J. He was well known as a professional aquarist and author of an entertaining and reliable work entitled "The Amateur Aquarist," which treats of the care and management of fresh water aquaria. Although suffering from physical disability and poor health he was of a remarkably hopeful disposition and will always be remembered by his friends and acquaintances as a pleasant companion and enthusiastic naturalist.

Messrs. Wm. T. Davis and Arthur Hollick read the following memoranda on

RECENT LITERATURE RELATING TO STATEN ISLAND.

"Just as it was in the Revolution," New York Tribune, April 14th, 1895

An illustrated account of the old Austen house at Clifton. The romantic stories associated with the mansion are mentioned.

"An Old Homestead Gone," New York Sun, July 26th, 1895.

An illustrated article on the Van Duzer homestead, the Van Duzer family and Commodore Vanderbilt, who resided for many years next door to the old house. Mr. Abraham Van Duzer operated the historic ferry between Staten Island and New York, and in the records of our County the old Richmond road is often mentioned as the road leading from Van Duzer's ferry to Richmond town.

"Iron Clad Bogie of Staten Island," New York Herald, July 29th, 1895.

A fanciful article attributing extraordinary powers to the croaking bull frog that resided in the "Swamp" or "Clifton Park pond" on the Concord downs, during the last week in July. This batrachian attracted considerable attention and scores of people repaired nightly to the spot to hear him croak. Unfortunately he was not accommodating enough to sing on the evening when a member of this Association appeared upon the scene, but probably he was an escaped "Jug-of-rum" bull frog (*Rana catesbiana*.) This species has never been reported from the Island though common enough in parts of New Jersey.

"Staten Island Indians," New York Sun, Aug. 27th, 1895.

"Relics of the Red Men," New York Sun, Aug. 28th, 1895.

These two articles recount in a graphic manner the interesting and valuable archaeological discoveries made at Tottenville by our fellow member, Mr. George H. Pepper.

"Indian Skeletons on Staten Island," New York Evening Post, Aug. 28th, 1895.

This is a criticism upon the recent articles in the daily papers on Indian remains. It refers to the Evening Post of January 4th, 1886, as evidence that similar objects were long ago found at Tottenville.

The New York Tribune, commencing with August 26th, 1895, has printed each Monday an illustrated article on Staten Island, by Mr. Isidor Lewi. The series is not yet complete. The three articles thus far published are pleasantly written and deal with the history and present day institutions of the Island.

The New York World, Aug. 8th, 1895, contains a notice of the death of Mr. Richard Christopher, former tenant and custodian of the Billopp house at Tottenville, together with a somewhat garbled account but excellent picture of the house.

In Frank Leslie's Popular Monthly, vol. xl, No. 2, Aug., 1895, pp. 235-240, is an article on "Haunted Houses," by Mr. Cromwell Childe, which includes legends and pictures of the Austen house at Clifton and the Britton house at Oakwood; also a brief reference to the Billopp house. The picture of the Britton house shows it as it was about five years ago. Recently a stone crusher was located close alongside and the stones which formed the walls were ground up into macadam for use on our new county roads. An account of this house, by Mr. Ira K. Morris, may be found in our Proceedings for May 13th, 1893.

Bulletin of the New York State Museum, vol. iii, No. 12, March, 1895, treats of the clay industries of the State, as enumerated and described by Mr. Heinrich Ries, under the direction of Mr. F. J. H. Merrill. On pages 133-136, under the caption "Staten Island Clays," is an illustrated description of the Kreischerville, Green Ridge, and Arrochar clays and "kaolins," with incidental discussion of their relations to the overlying Yellow Gravel and the probable influence of glaciation in eroding and contorting them. One illustration represents the Androvetta bank at Kreischerville, another the overthrust fold beneath the moraine in the Fingerboard road gravel pit, to which attention has been called on several occasions.

Mr. Davis exhibited dried and mounted specimens, representing new or interesting plants in the local flora and read the following

BOTANICAL NOTES.

Aquilegia Canadensis L. Wild columbine. Reported many years ago from the Island and lately rediscovered near the Methodist Episcopal church, Amboy road, Tottenville. Mr. Geo. H. Pepper, with whom I collected the specimens exhibit-

ed, states that this columbine also grows along the brook that flows through Decker's Swamp at Richmond Valley, and at the bluff, Tottenville.

Silene vulgaris, (Moench) Garcke. Bladder campion. Near Methodist Episcopal church, Amboy road, Tottenville.

Medicago sativa L. Lucerne. In field on Fort Hill, New Brighton.

Coronilla varia L. Escaped to both sides of Sprague avenue, Tottenville.

Crataegus coccinea L. Karles Neck, near the old Morgan road.

Valeriana sylvatica Banks. Garden valerian. Escaped to side of Fresh Kill road, near Richmond.

Solidago patula Muhl. Not uncommon in the valley of Reed's basket-willow swamp. Also grows near the Ketchum mill pond back of Richmond.

Azalea viscosa L. A pink flowered form of this species grows near Arlington station, Mariners' Harbor. The same color variation has been observed in New Jersey specimens by Dr. Britton, and on Long Island by Mr. Arthur Hollick. (Bulletin of the Torrey Botanical Club, vol. xviii, page 255).

Pentstemon Digitalis (Sweet) Nutt. In a field near the Manor road, West New Brighton, collected by Mr. Theo. C. Leng.

Broussonetia papyrifera Vent. Paper mulberry. Escaped at West New Brighton, Mariners' Harbor and Richmond.

Populus heterophylla L. Lyster Pond, Valley Forge. Also growing in neighboring swamps.

Mr. Hollick exhibited specimens of *Onopordon acanthium* L., the cotton, or Scotch thistle, an addition to the local flora, which has become established in old gardens and pastures at Sailor's Snug Harbor.

Mr. Davis also read the following note:

A ZONE OF VEGETATION ON THE PERPENDICULAR BLUFF AT ST. GEORGE.

Last spring, the Baltimore and Ohio Railroad Company employed a steam shovel to remove a part of the bluff at St. George, and when operations were dis-

continued a perpendicular bank of about eighteen feet remained. Near the top of the bank there was a black soil line indicating the original surface, the overlying soil being the result of grading during the years when the "Flats" were used as a ball and cricket field.

As the summer advanced the precipitous bank acquired quite a different appearance, the chief feature of which can still be observed at the date of this meeting. It consists of a band of vegetation composed of many of the common garden weeds and moss, growing on a zone of moist soil. This band commences about five feet from the top of the bank and averages about four feet in width.

Mr. Wm. S. Page examined the bank with me last July, and we found it to consist, except where filled in, of two kinds of drift material. The uppermost stratum, which includes the well marked moist zone, is composed of a very fine sand, closely packed. Underlying this is a much more porous combination of boulders, pebbles and sand. Of course the interest centers in the question why the same stratum of sand should be sharply divided into a moist and dry layer. This seems to be due to worm borings and roots that abound in the upper layer, but rarely extend to the moist one, and it is probable that they have produced the natural drainage. Beneath the moist zone, as previously mentioned, come the boulders, pebbles and sand, which naturally retain but little water, leaving the broad central band, the only part of all the precipitous bank, wet enough to support a growth of moss and garden weeds.

Mr. Walter C. Kerr referred to the remarkable thunder storm of July 20th and the earthquake of Sept. 1st and read the following memoranda:

AN UNUSUAL ELECTRICAL DISPLAY.

On the evening of Saturday, July 20th, in the eastern and northern sky, there was a display of lightning rarely equalled in kind or extent in this locality. It probably began shortly after 7 o'clock, but being at dinner I took no notice of it

beyond realizing that a heavy thunder storm was in progress, and not very near. At 7.45, however, on stepping onto the porch, an electrical illumination of a brilliancy hard to describe was visible. The flashes were extremely vivid and at times as many as six could be seen simultaneously. The heavy strokes were chiefly vertical, but many were horizontal. Several times vertical and horizontal strokes flashed at the same instant, forming crosses, and occasionally the sky would contain simultaneously several bright bolts, a flash or two of heat lightning and a long branching horizontal discharge.

The storm extended from a little west of north to east, covering an area reaching from the Hudson River valley to the Long Island coast. But little thunder was audible and only in distance rolls which could not be identified with any particular lightning stroke, making it impracticable to estimate the distance.

From the newspaper accounts the following day the storm seemed to extend from New York northward and eastward over the area above mentioned, and from a friend I have learned that in Sing Sing it was the hardest thunder storm of late years, while at Peekskill it was comparatively light, which data, though insufficient, would indicate that its center was approximately thirty miles distant.

By the light of the flashes, one could discern what seemed like three horizontal clouds, the highest being at an elevation of about 45 degrees, the play of lightning appearing to be between the earth and each of these clouds and horizontally in the spaces between them. Such a view is however so deceptive as to be of little moment, especially since some of the clouds may have been comparatively near, while much of the storm must have been quite distant. Photography would scarcely convey the beauty of the branching horizontal flashes and it would be nearly impossible to describe the effect which resulted from the combination of such variegated forms.

I have never seen a more interesting electrical phenomenon or one in which

there was so much of scenic effect. The distance, combined with the absence or very low roll of thunder, together with my point of view, overlooking the harbor girdled with a fringe of lights, gave a strange cast to the display, and it seemed as though it were being produced intentionally, for effect, by competing sources of brilliancy. This lasted almost constantly for about an hour and by 9 o'clock the impressive part had quite passed. Little report was given of damage ensuing, and I am advised that at Sing Sing, where it seemed the heaviest, but little damage was done. Locally there were a few bright flashes accompanied by heavy thunder, which must have come from the extreme southern edge of the storm.

THE EARTHQUAKE OF SEPT. 1, 1895.

The earthquake which passed this region on the morning of September 1st, was distinctly felt on Staten Island and

has been commonly reported as most severe along the ridge of serpentine hills. Such reports are probably correct as the formation of the hills would naturally transmit the undulations more sharply than the softer yielding ground of the lower lands.

I was awakened by the shock and instinctively grasping my watch timed it at 6h., 12m., 56 sec. As my watch was 55 seconds fast on the previous day I would fix the time as very near twelve minutes past six a. m., eastern time.

The shocks succeeded each other rapidly during a period of about fifteen seconds and, while I did not count them, there were half a dozen or more.

I received a distinct impression of the vibrations passing from a southerly to a northerly direction, which was corroborated by the subsequent accounts of the disturbance throughout the large area from which it was reported.

PROCEEDINGS
OF THE
NATURAL SCIENCE ASSOCIATION
OF STATEN ISLAND.

VOL. IV. No. 20.

OCT. 12th, 1895.

Meeting held at the residence of Mr. Thomas Craig, Vine street, New Brighton.

In the absence of the president Dr. C. W. Townsend was elected chairman *pro tem.*

Mr. Wm. T. Davis read the following paper on

A STATEN ISLAND TICK AS A PAINFUL HUMAN PARASITE.

In Packard's "Guide to the Study of Insects" occurs the following paragraph: "Mr. J. Stauffer writes me, that on June 23d, the daughter of Abraham Jackson (colored) playing among the leaves in a wood, near Springville, Lancaster county, Penn., on her return home complained of a pain in the arm. No attention was paid to it till the next day, when a raised tumor was noticed, a small portion protruding through the skin, apparently like a splinter of wood. The child was taken to a physician who applied the forceps, and after considerable pain to the child, and labor to himself, extracted a species of *Ixodes*, nearly one quarter of an inch long, of an oval form, and brown mahogany color, with a metallic spot, like silver bronze, centrally situated on the dorsal region." Dr. Packard identified the tick as *Ixodes unipunctata*.

Dr. Wm. C. Walser was called upon last July by a patient living on the south shore of Staten Island, suffering from a similar swelling to the one mentioned above, and from which a large tick was also taken. This was kindly given me by Dr. Frederick Hollick, and finally sent to Washington for more certain identification. It proved to be the same species that attacked the little colored girl in Pennsylvania as appears by the

following:

Mr. William T. Davis:

DEAR SIR:—After careful comparison of the tick which you send with yours of the 5th, with the named collection of ticks brought together by the late Dr. Geo. Marx, and which has been recently purchased by the U. S. National Museum, it has been decided by the Assistant Curator of Insects, Mr. M. L. Linell, that the species is *Amblyomma unipunctatum*, of Packard. Yours truly,

L. O. HOWARD, Entomologist.

BOTANICAL NOTES.

Mr. Davis also presented the following memorandum and a specimen of the water weed:

Elodea Canadensis Michx., also known as *Anacharis Canadensis* or water-weed, has never been reported from the Island, but now grows abundantly in one of the Clove valley ponds, having been introduced during the summer of 1894. The original plants were brought from the Thousand Islands, Canada, by Mr. Thomas Craig. The species, however, occurs much nearer home than the St. Lawrence and is abundant in parts of New Jersey, the Valley of the Croton, etc.

Dr. N. L. Britton sent a note to the effect that the *Silene* found by Mr. Kerr at Arrochar (Proceedings, June 8th, 1895) is *Silene nutans* L. an addition to the local flora. This plant has been reported from the eastern coast of Massachusetts.

MISCELLANEOUS MATERIAL, EXHIBITED.

Mr. Thomas Craig exhibited *Trichodina pediculus*, a parasite on *Hydra*, collected recently in the Clove valley.

Dr. C. W. Townsend presented a discoid stone and two stone axes found at Arrochar. But few Indian implements have come into the possession of the Association from that portion of the Island.



DIGEST OF THE LIBRARY REGULATIONS.

No book shall be taken from the Library without the record of the Librarian.

No person shall be allowed to retain more than five volumes at any one time, unless by special vote of the Council.

Books may be kept out one calendar month; no longer without renewal, and renewal may not be granted more than twice.

A fine of five cents per day incurred for every volume not returned within the time specified by the rules.

The Librarian may demand the return of a book after the expiration of ten days from the date of borrowing.

Certain books, so designated, cannot be taken from the Library without special permission.

All books must be returned at least two weeks previous to the Annual Meeting.

Persons are responsible for all injury or loss of books charged to their name.

